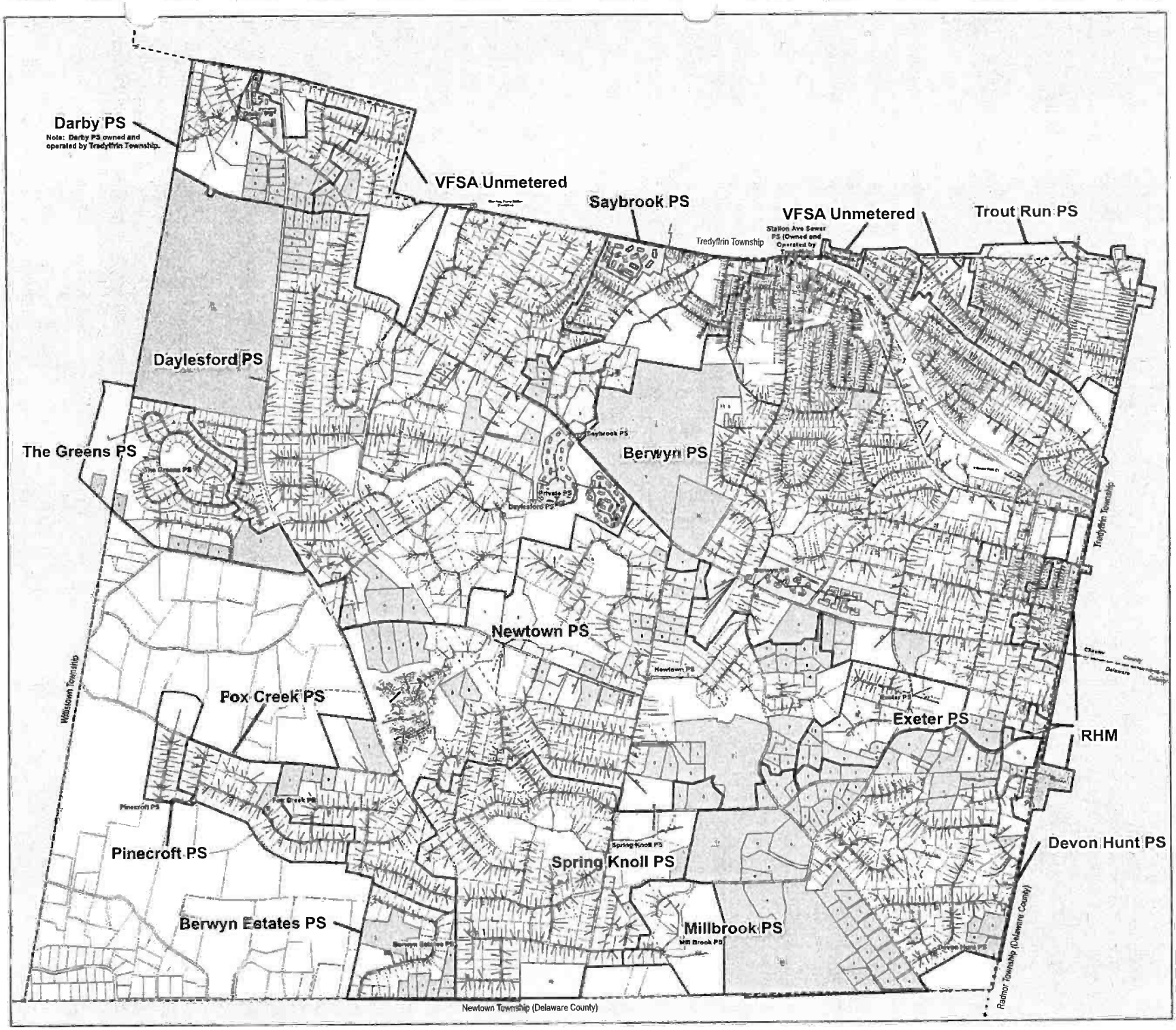


EASTTOWN TOWNSHIP

APPROVED AND PROJECTED CONNECTIONS

LEGEND

- Manhole
- Air Release Valve
- Grinder Pump
- Gate Valve
- Sampling Meter Pit
- Pump Station
- Municipal Boundaries
- Private Gravity Sewer
- Gravity Sewer
- Force Main
- Low Pressure Sewer
- Lateral (EDU=1)
- Lateral (EDU>1)
- Drainage Basin
- Areas Flowing to RHM
- Approved Subdivisions/ Projects not Connected
- Private Sewers
- Projected Connections 2025
- Potential Connections 2035

0 500 1,000
Feet

1 Inch = 500 feet

NOTES:

*Please reference the "Approved and Projected EDU Tracking List" spreadsheet.

The following subdivisions/projects have been approved, but are not connected.

A. South Leopard Road Associates (south side)
B. Lewis Subdivision (Dorset & South Devon)
D. Hill Custom Homes (Mundt Property, Whitfield Rd.)
E. Blackburn Farm - 1135 Sugartown Rd.
F. Chen Wang Mei-Han - 435 Conestoga Rd.
H. Thompson - Subdivision
I. Keyes - Church Road
K. J. B. A. Properties - 34 Leopard Rd
M. Boathouse Realty Associates, LP (222 S. Waterloo Road)
N. 207 South Waterloo Rd.
S. Corkhill
U. 13 Woodside Avenue
W. 8 Ballard Avenue

ARRO

Exhibit D

Easttown Municipal Authority

Flow Information for Each Pump Station

EXHIBIT - D

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
FLOW INFORMATION FOR EACH PUMPING STATION

		Pump Station Capacities						Present Flows	2-Year Projected Ann. Avg. Daily Flow			Future Projected Ann. Avg. Daily Flow		
Pumping Station Name[1]	No. of Pumps	Permit Design Capacity (gpm)	Ultimate Design Capacity (gpm)	Current Permit Peak Flow Capacity[2]	Ultimate Permit Peak Flow Capacity[2]	PADEP Peaking Factor[5]	Current Permit Annual Average Daily Flow Capacity	Actual Annual Average Daily Flow - 2018[3]	Projected Ann. Avg. Daily Flow - 2020[4]	PADEP Peaking Factor[5]	Projected Peak Flow - 2020	Projected Annual Avg. Daily Flow - 2040[4]	PADEP Peaking Factor[5]	Projected Peak Flow - 2040
Berwyn	3	**920**	**1,019**	2,649,600	2,936,000	2.50	1,059,840	836,224	847,206	3.03	2,567,040	957,046	3.03	2,899,848
Berwyn Estates	2	73	73	105,120	105,120	2.50	42,048	7,338	8,017	4.17	33,430	14,805	4.17	61,737
Devon Hunt	2	**220**	**252**	316,800	362,880	2.50	126,720	72,244	73,697	3.83	282,261	88,232	3.83	337,927
Exeter	2	100	100	144,000	144,000	2.50	57,600	8,570	8,942	4.17	37,289	12,563	4.17	52,405
Fox Creek[7]	2	50	50	72,000	72,000	2.50	28,800	11,952	12,601	4.11	51,789	19,089	4.11	78,456
Millbrook	2	40	40	57,600	57,600	2.50	23,040	3,507	4,219	4.20	17,720	11,340	4.20	47,628
Newtown	2	**550**	**725**	792,000	1,044,000	2.50	316,800	156,964	166,869	3.55	592,386	265,923	3.55	944,027
Pinecroft	2	32	32	46,080	46,080	2.50	18,432	2,951	3,141	4.25	13,349	5,040	4.25	21,420
Spring Knoll	2	**100**	**270**	144,000	388,800	2.50	57,600	42,945	47,403	3.82	181,078	91,980	3.82	351,364
Daylesford	2	**590**	**718**	849,600	1,033,620	2.50	339,840	302,675	302,427	3.50	1,058,493	299,943	3.50	1,049,801
The Greens	2	200	200	288,000	288,000	2.50	115,200	18,678	20,674	3.96	81,869	40,635	3.96	160,915
Saybrook	2	**275**	**275**	396,000	396,000	2.50	158,400	114,850	115,321	3.77	434,759	120,028	3.77	452,504

Notes:

(1) Berwyn, Daylesford and Saybrook pumping stations convey flow to the Vally Creek Trunk Sewer. The stations listed directly under those whose names are in bold type are tributary to that station whose name is in bold type.

(2) Current and Ultimate Permit Peak Flow Capacity based on one pump always on stand-by.

(3) Actual Annual Average Daily Flows are as per flow meter readings for all pumping stations.

(4) Projected Annual Average Daily flow in 2020 and at buildout (2040) is based on an interpolation of the Year 2040 Easttown Projected Flow, specified as 1.686 MGD, which is contained in the *Act 537 Supplement for Wilson Road Force Main*, Table 3-3, Average Daily Wastewater Flow Projections.

(5) PADEP Peaking Factor is interpolated from PADEP Southeast Regional Office's "Sewage Pumping Station Guidance (Rev. 3/24/99)".

(6) All flow rates above are in gallons per day (gpd).

(7) The Spring Knoll Present Flow and 2-Year Projected Daily Flow exceeds the calculated Current Permit Daily Capacity based on peaking factor, but Future Projected Peak Projected Flow is within the station's Ultimate Permit Peak Flow Capacity.

Exhibit E

Easttown Municipal Authority

Monthly Flow Total to VFSA

Versus Rainfall - Graph

Graph 3

GRAPH - #3

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY TOTAL FLOW TO VFSA VERSUS RAINFALL

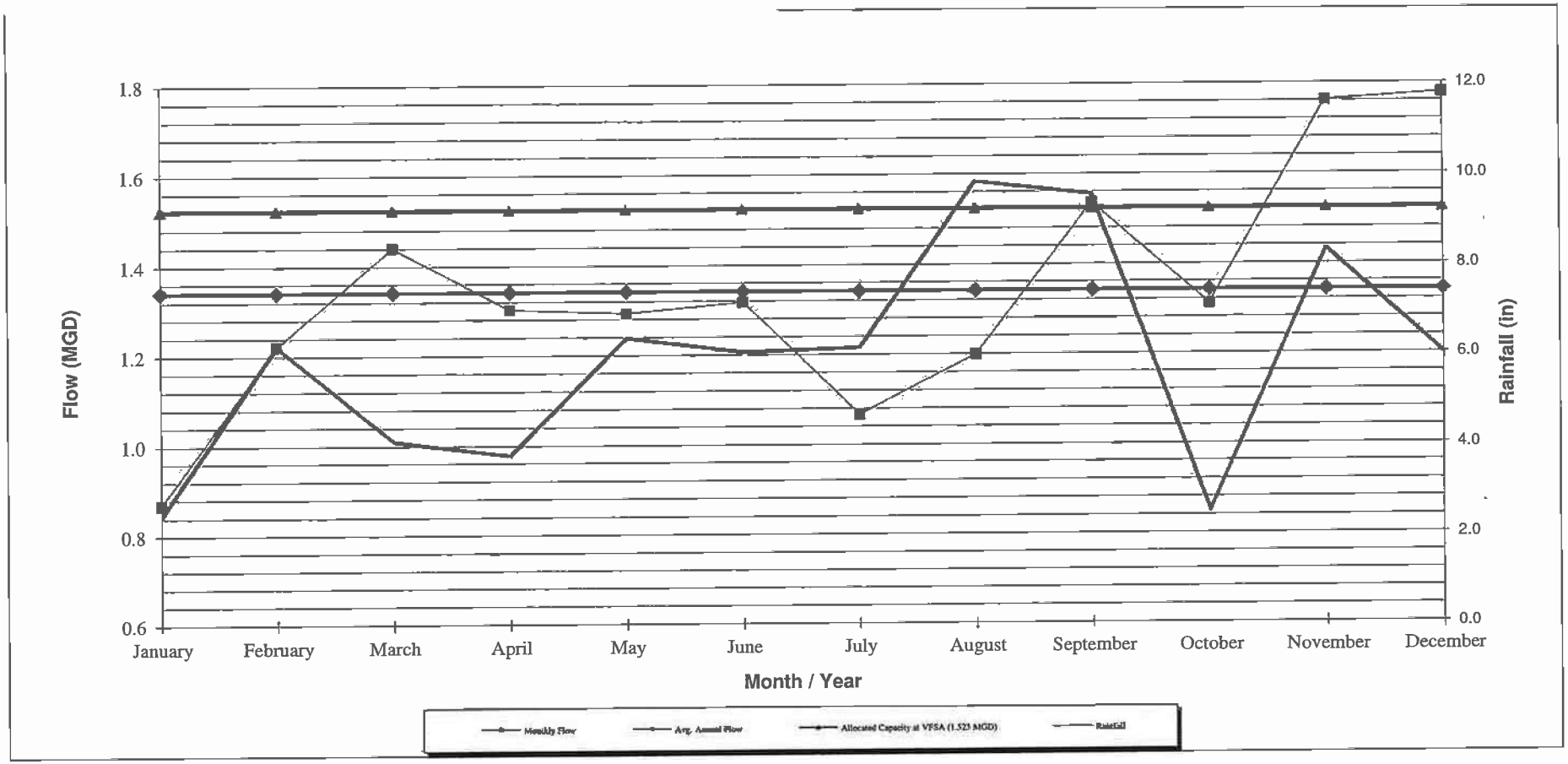


Exhibit F

Easttown Municipal Authority

Pump Stations Flow to VFSA

Versus Rainfall - Summary and Graphs

Berwyn Pump Station
Daylesford Pump Station
Saybrook Pump Station

Table 4A, Graphs 4A, 4B and 4C

Table 4A

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY PUMP STATION FLOW TO VFSA

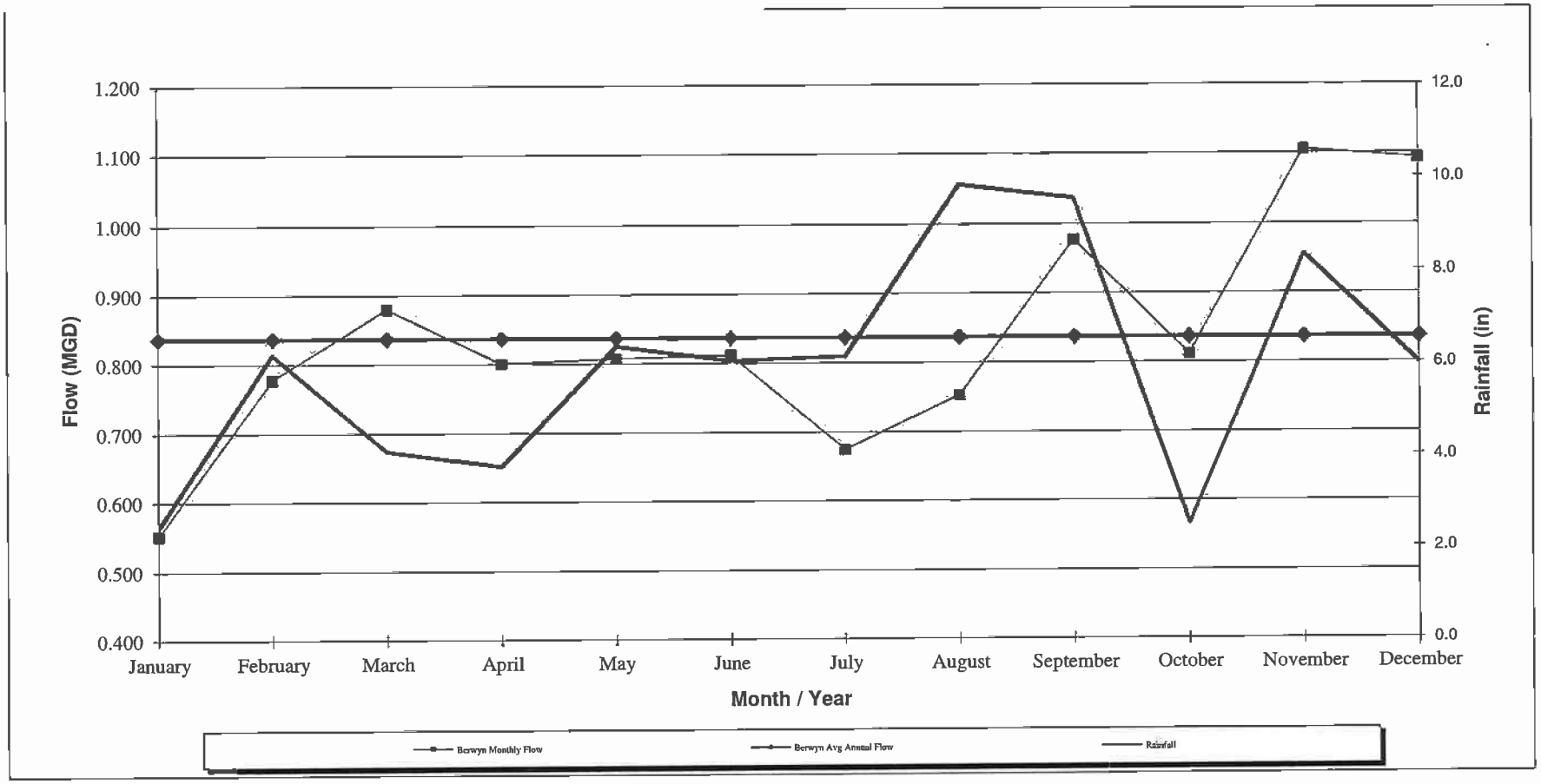
BERWYN, DAYLESFORD and SAYBROOK PUMP STATIONS

Year	Month	Monthly Flow, MGD			Rainfall
		Berwyn	Daylesford	Saybrook	
2018	January	0.5510	0.1764	0.0855	2.43
	February	0.7774	0.2596	0.1036	6.20
	March	0.8785	0.3535	0.1147	4.09
	April	0.8000	0.3097	0.1071	3.76
	May	0.8068	0.2972	0.1046	6.36
	June	0.8112	0.3037	0.1162	6.04
	July	0.6741	0.2225	0.1004	6.13
	August	0.7524	0.2573	0.1102	9.82
	September	0.9752	0.3289	0.1312	9.53
	October	0.8107	0.2997	0.1147	2.48
	November	1.1047	0.3945	0.1484	8.32
	December	1.0927	0.4291	0.1414	5.97
Avg Annual Flow (MGD) =		**0.8362**	**0.3027**	**0.1149**	

GRAPH - #4A

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY FLOW FROM METERED PUMP STATIONS TO VFSA VERSUS RAINFALL

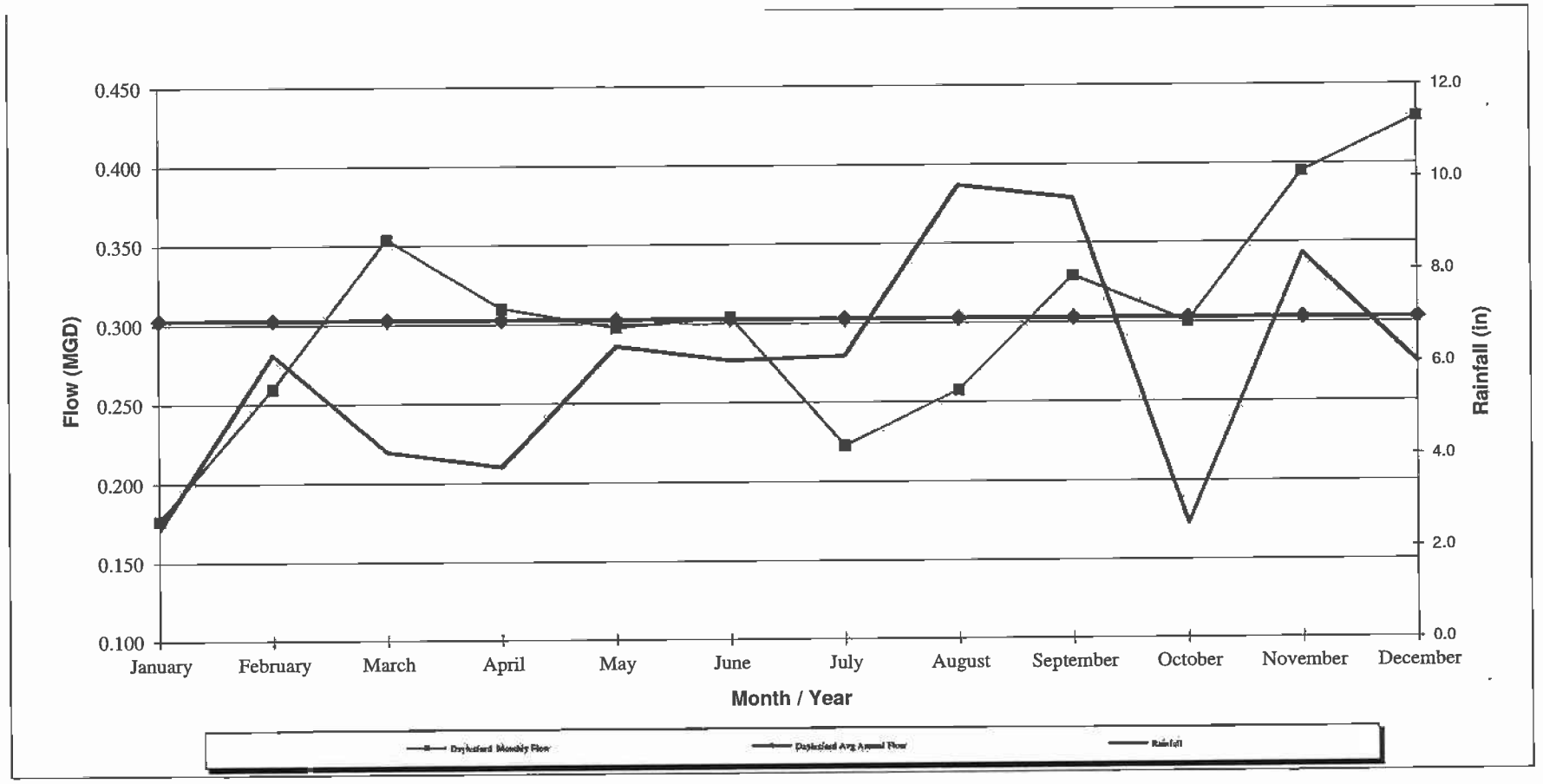
BERWYN PUMP STATION



GRAPH - #4B

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY FLOW FROM METERED PUMP STATIONS TO VFSA VERSUS RAINFALL

DAYLESFORD PUMP STATION



GRAPH - #4C

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY FLOW FROM METERED PUMP STATIONS TO VFSA VERSUS RAINFALL

SAYBROOK PUMP STATION

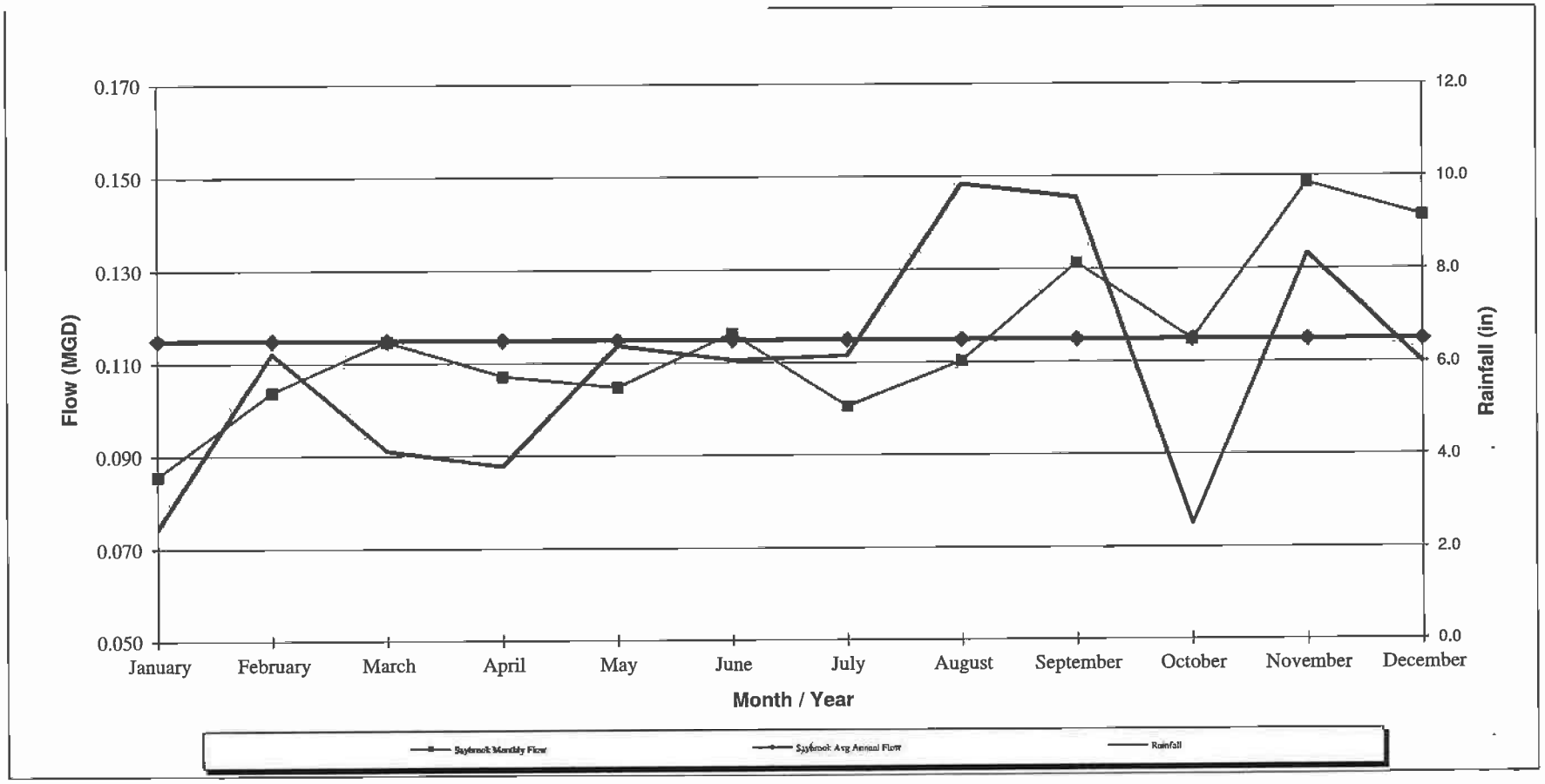


Exhibit G

Easttown Municipal Authority

Small Metered Pump Stations Flow Versus Rainfall - Summary and Graphs

Berwyn Estates Pump Station
Devon Hunt Pump Station
Exeter Pump Station
Fox Creek Pump Station
Millbrook Pump Station
Newtown Pump Station
Pinecroft Pump Station
Spring Knoll Pump Station
The Greens Pump Station

Table 4B, Graphs 4D to 4L

Table 4B

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

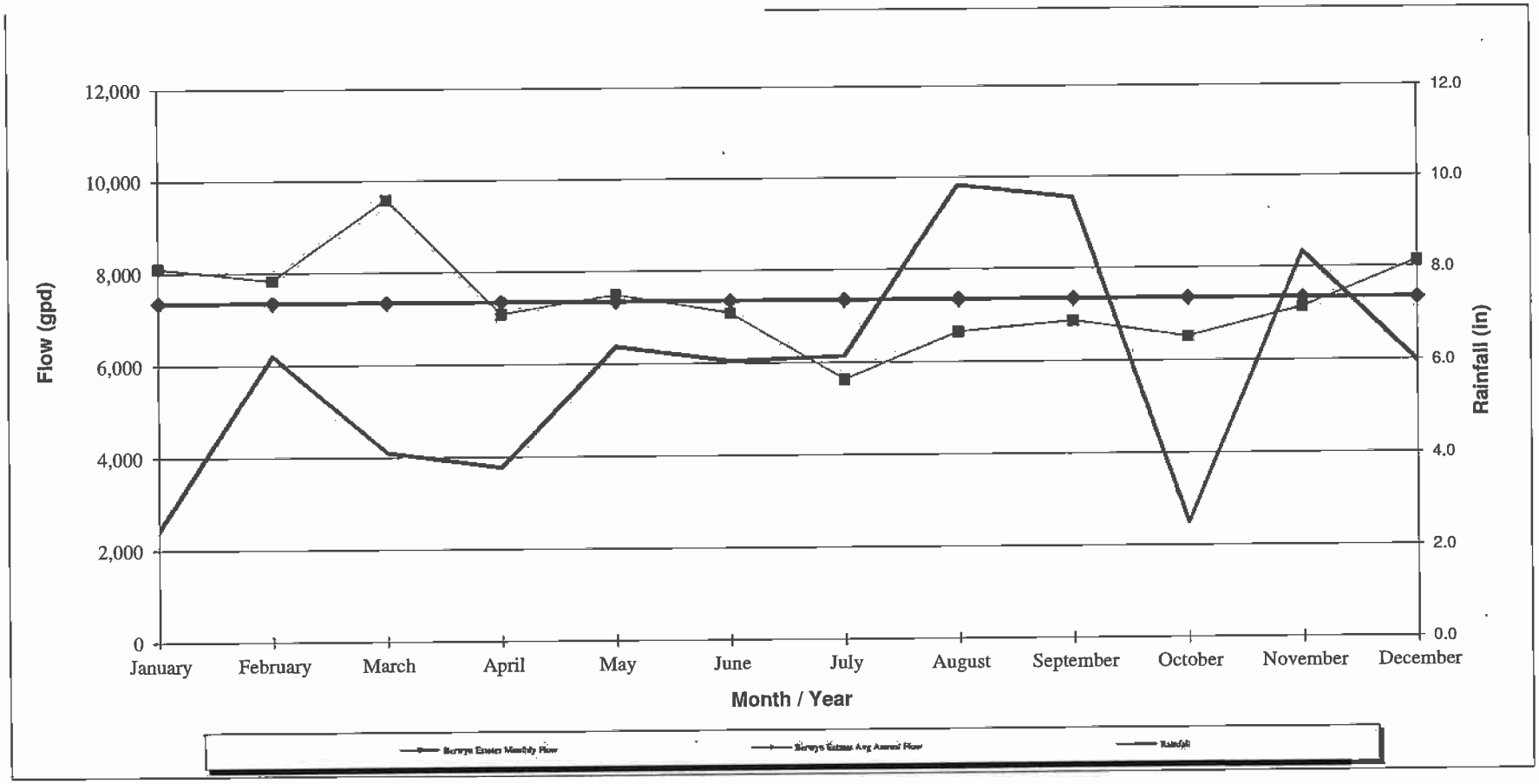
Year	Month	Monthly Flow, GPD									Rainfall
		Berwyn Estates	Devon Hunt	Exeter	Fox Creek	Millbrook	Newtown	Pinecroft	Spring Knoll	The Greens	
2018	January	8,096	58,141	7,920	9,945	4,673	119,362	2,988	38,504	19,526	2.43
	February	7,825	69,872	8,406	11,278	3,219	146,848	2,996	43,218	18,766	6.20
	March	9,572	76,410	9,176	11,211	3,139	149,618	2,734	40,870	17,509	4.09
	April	7,075	71,093	9,402	11,187	3,617	145,723	2,986	40,309	18,014	3.76
	May	7,480	71,788	8,895	11,522	3,642	151,187	2,934	41,167	18,989	6.36
	June	7,069	70,914	7,540	10,535	3,548	147,386	2,743	39,257	18,263	6.04
	July	5,639	61,178	5,724	10,324	2,962	125,184	2,571	35,282	17,958	6.13
	August	6,643	62,355	6,940	11,053	2,777	139,423	2,592	37,798	18,735	9.82
	September	6,863	76,762	9,728	14,278	3,512	175,933	3,449	45,244	18,406	9.53
	October	6,519	66,914	7,984	11,421	3,504	153,497	2,813	40,836	18,373	2.48
	November	7,133	89,362	10,436	15,674	3,543	213,386	3,364	56,169	19,625	8.32
	December	8,137	92,136	10,689	15,001	3,950	216,018	3,240	56,687	19,971	5.97
Avg Annual Flow (GPD) =		**7,338**	**72,244**	**8,570**	**11,952**	**3,507**	**156,964**	**2,951**	**42,945**	**18,678**	

AAQ
MGD

GRAPH - #4D

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

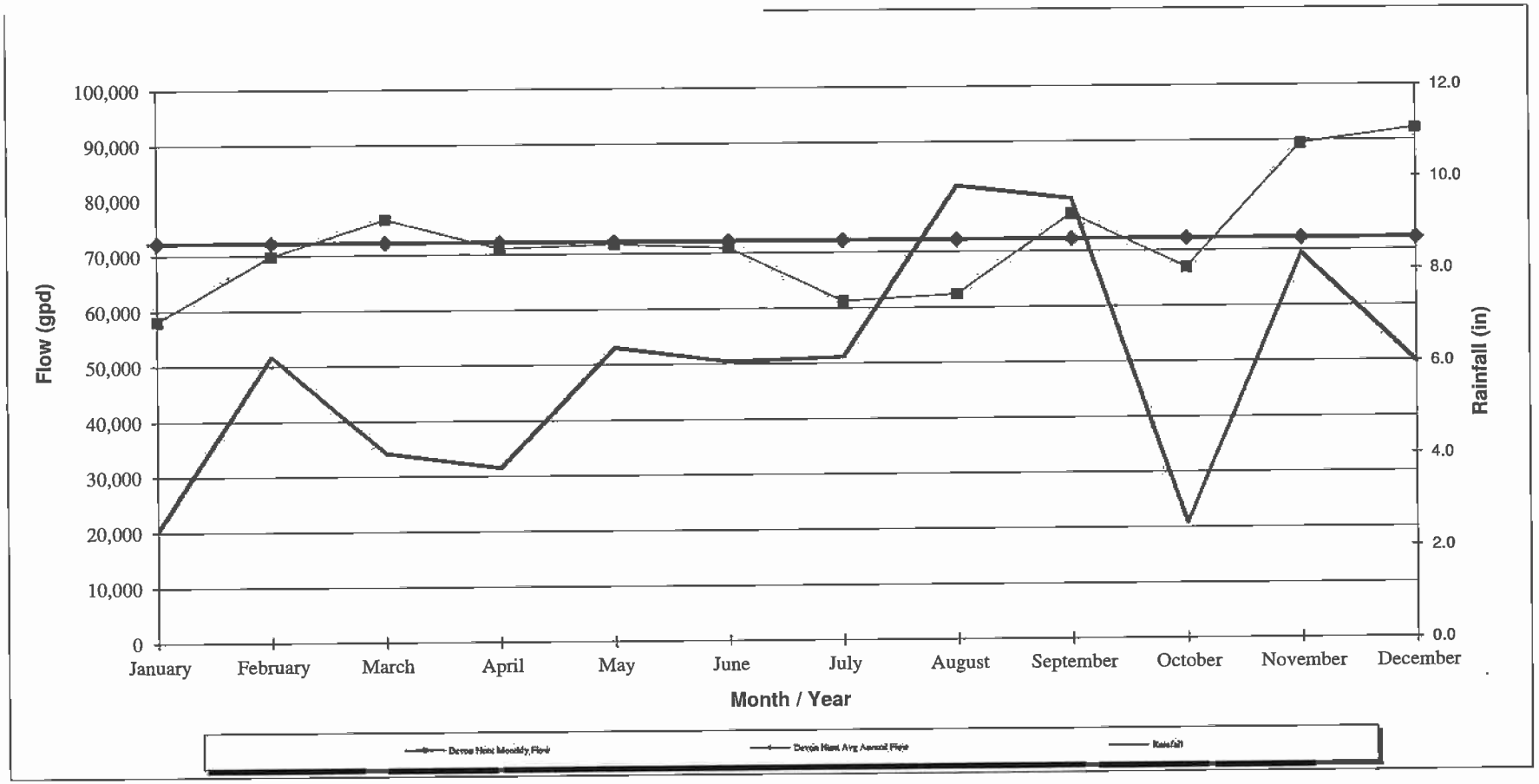
BERWYN ESTATES PUMP STATION



GRAPH - #4E

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

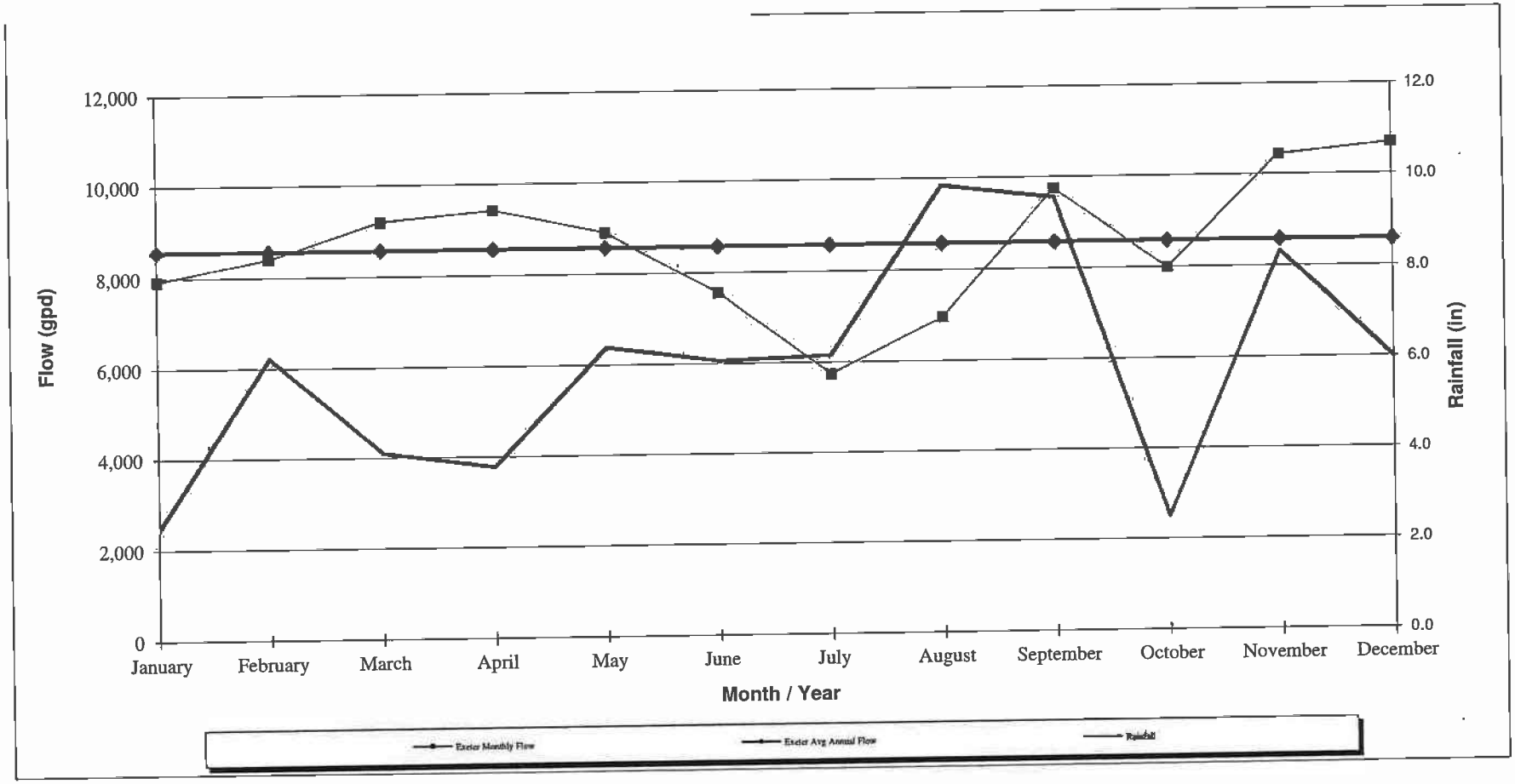
DEVON HUNT PUMP STATION



GRAPH - #4F

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

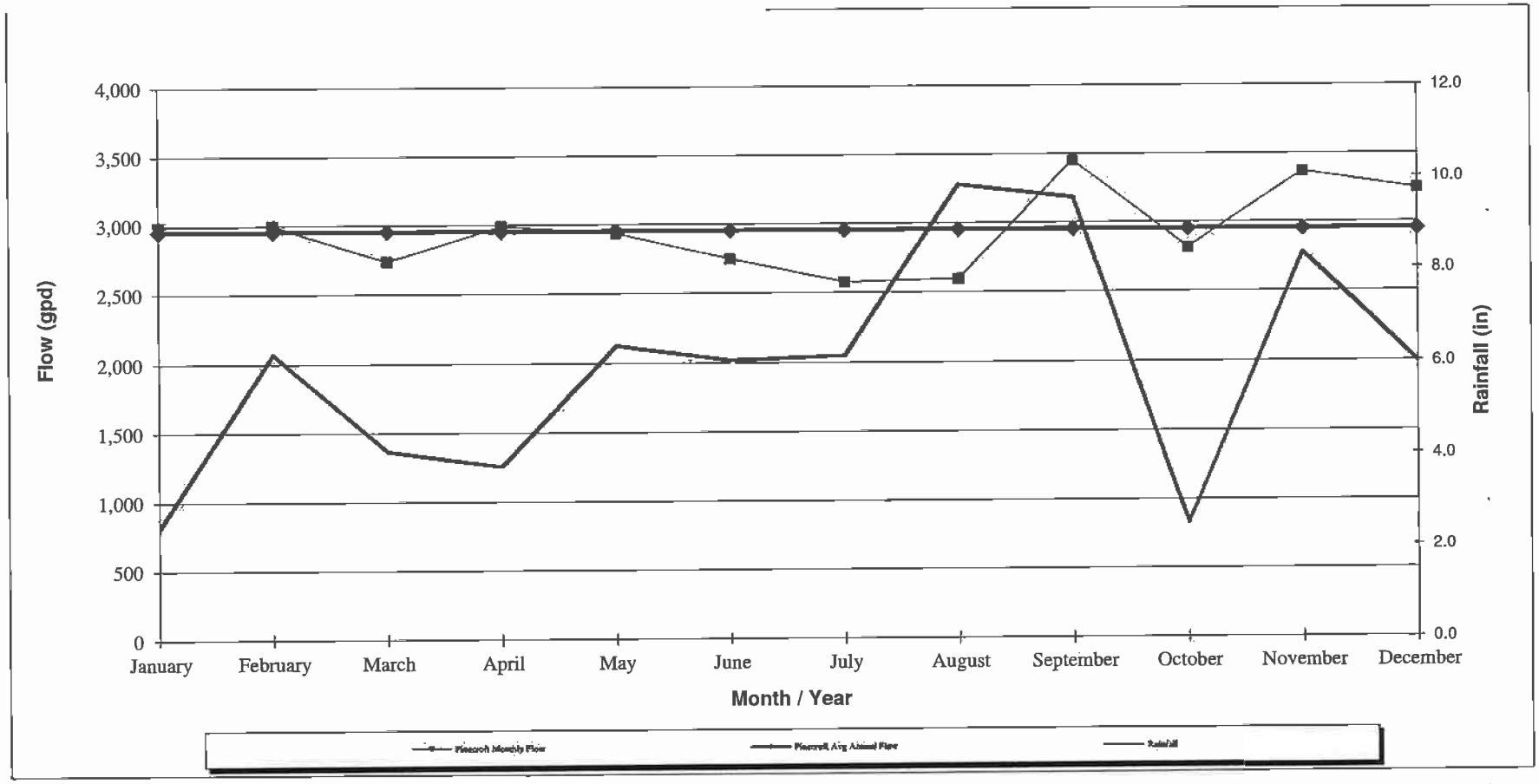
EXETER PUMP STATION



GRAPH - #4J

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

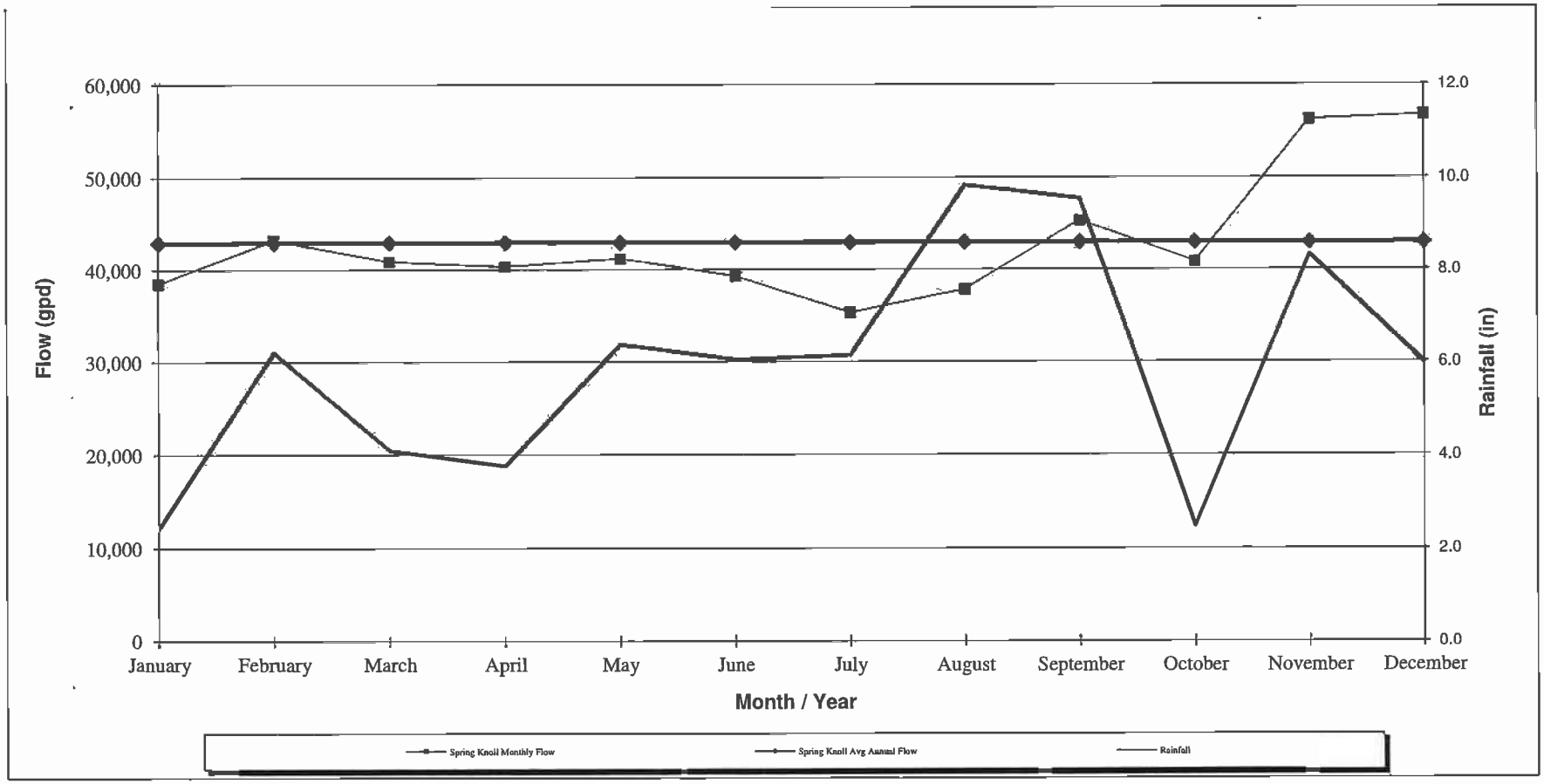
PINECROFT PUMP STATION



GRAPH - #4K

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

SPRING KNOLL PUMP STATION



GRAPH - #4L

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
MONTHLY SATELLITE PUMP STATION FLOWS

THE GREENS PUMP STATION

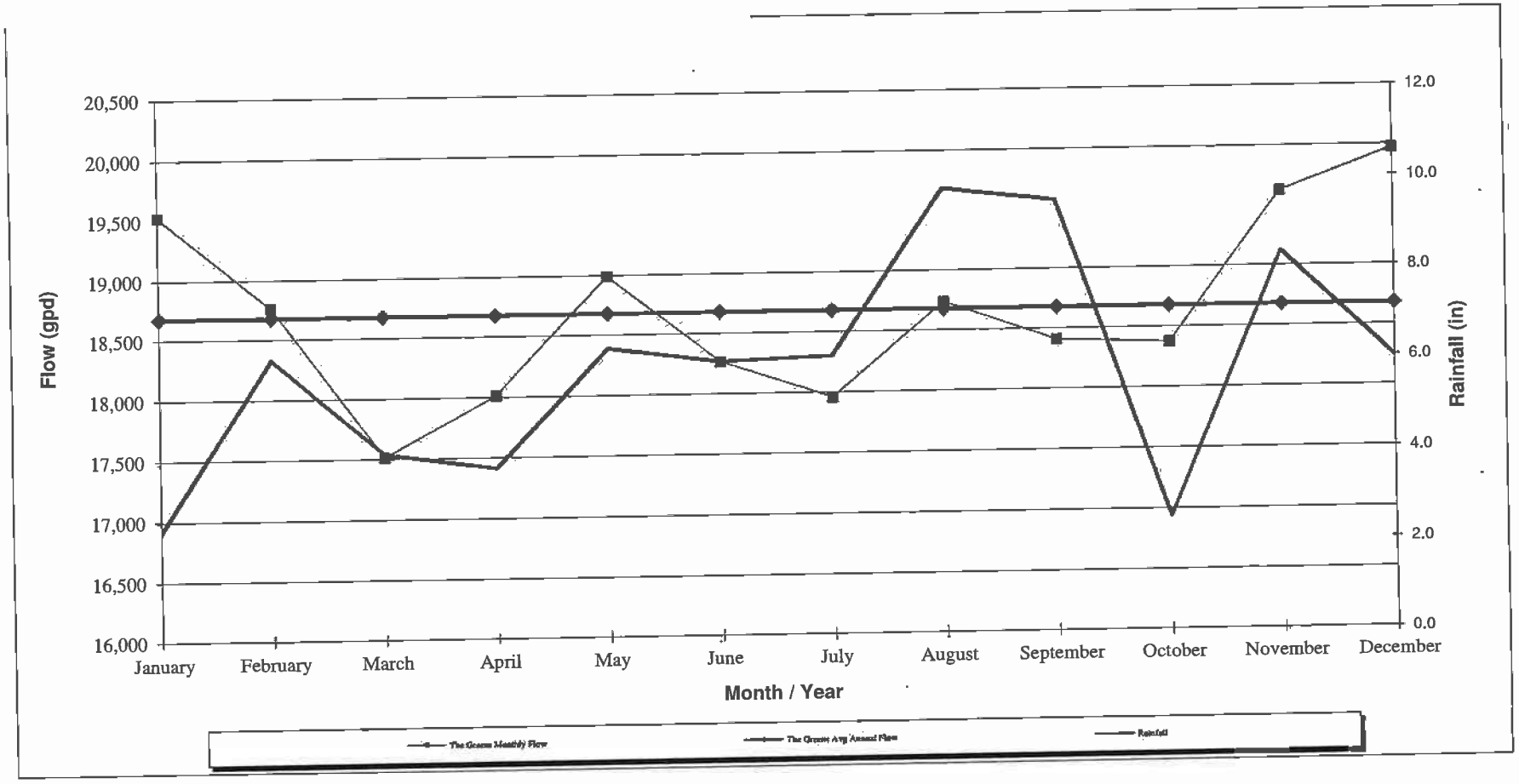


Exhibit H

Easttown Municipal Authority

1-Inch Plus Rainfall Versus Flow

At Metered Pump Stations – Summary

Berwyn Pump Station
Berwyn Estates Pump Station
Daylesford Pump Station
Devon Hunt Pump Station
Exeter Pump Station
Fox Creek Pump Station
Millbrook Pump Station
Newtown Pump Station
Pinecroft Pump Station
Saybrook Pump Station
Spring Knoll Pump Station
The Greens Pump Station

Table 5

Table 5

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW SUMMARY AT METERED PUMP STATIONS

		Berwyn PS Rainfall Flow		Berwyn Estates PS Rainfall Flow		Daylesford PS Rainfall Flow		Devon Hunt PS Rainfall Flow		Exeter PS Rainfall Flow		Fox Creek PS Rainfall Flow	
Rain Date	Rain (in.)	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor
02/04/18	1.02	0.689	0.82	0.010	1.38	0.216	0.71	0.071	0.98	0.010	1.15	0.012	1.02
02/11/18	1.37	1.398	1.67	0.010	1.33	0.359	1.19	0.122	1.69	0.015	1.74	0.023	1.96
03/02/18	1.20	1.310	1.57	0.006	0.83	0.409	1.35	0.118	1.63	0.014	1.61	0.020	1.66
04/16/18	2.03	1.492	1.78	0.008	1.13	0.468	1.54	0.146	2.02	0.017	1.98	0.024	2.03
05/13/18	1.02	0.732	0.88	0.008	1.03	0.274	0.90	0.067	0.92	0.008	0.89	0.012	1.01
05/17/18	1.12	1.163	1.39	0.009	1.18	0.350	1.16	0.106	1.46	0.013	1.52	0.018	1.54
05/27/18	1.17	0.907	1.08	0.006	0.85	0.318	1.05	0.083	1.15	0.009	1.09	0.012	0.97
06/10/18	2.44	0.816	0.98	0.009	1.18	0.292	0.96	0.081	1.12	0.008	0.89	0.012	1.03
06/11/18	1.81	1.801	2.15	0.009	1.27	0.513	1.69	0.156	2.16	0.024	2.75	0.022	1.80
07/22/18	1.26	0.828	0.99	0.006	0.86	0.251	0.83	0.069	0.96	0.007	0.82	0.013	1.08
07/25/18	1.02	0.924	1.10	0.006	0.83	0.271	0.89	0.076	1.05	0.008	0.97	0.012	0.97
08/11/18	1.99	0.680	0.81	0.006	0.85	0.217	0.72	0.054	0.75	0.008	0.97	0.009	0.76
08/13/18	3.51	1.283	1.53	0.009	1.18	0.366	1.21	0.109	1.51	0.013	1.46	0.024	2.03
09/07/18	1.80	0.829	0.99	0.007	0.97	0.253	0.84	0.067	0.93	0.008	0.92	0.013	1.09
09/08/18	1.04	1.341	1.60	0.007	0.92	0.330	1.09	0.110	1.52	0.013	1.53	0.020	1.64
09/09/18	1.44	1.541	1.84	0.009	1.22	0.408	1.35	0.117	1.62	0.017	1.99	0.023	1.94
09/18/18	1.10	0.994	1.19	0.007	1.02	0.342	1.13	0.072	1.00	0.009	1.09	0.015	1.27
09/25/18	1.51	1.184	1.42	0.008	1.12	0.370	1.22	0.106	1.46	0.013	1.50	0.019	1.60
09/28/18	1.31	1.501	1.79	0.008	1.08	0.459	1.52	0.116	1.61	0.018	2.15	0.022	1.86
10/27/18	1.01	0.967	1.16	0.008	1.10	0.311	1.03	0.083	1.15	0.009	1.09	0.015	1.23
11/15/18	1.21	1.048	1.25	0.007	0.93	0.381	1.26	0.090	1.24	0.009	1.01	0.015	1.24
11/24/18	2.00	1.321	1.58	0.008	1.13	0.457	1.51	0.128	1.77	0.020	2.34	0.022	1.85
12/16/18	1.04	1.307	1.56	0.009	1.22	0.438	1.45	0.107	1.48	0.015	1.69	0.021	1.76
12/21/18	1.11	2.032	2.43	0.010	1.33	0.607	2.01	0.158	2.19	0.030	3.49	0.034	2.86
12/28/18	1.29	1.564	1.87	0.009	1.23	0.537	1.77	0.123	1.71	0.021	2.42	0.024	2.02
Yearly Avg Flow (MGD) =		**0.836**		**0.007**		**0.303**		**0.072**		**0.009**		**0.012**	
Meter Max (MGD) =		**5.000**		**0.140**		**1.400**		**0.560**		**0.280**		**0.140**	
High Peaking Factor =			**2.43**		**1.38**		**2.01**		**2.19**		**3.49**		**2.86**
Average Peaking Factor =			**1.42**		**1.09**		**1.22**		**1.40**		**1.56**		**1.53**

		Millbrook PS Rainfall Flow		Newtown PS Rainfall Flow		Pinecroft PS Rainfall Flow		Saybrook PS Rainfall Flow		Spring Knoll PS Rainfall Flow		The Greens PS Rainfall Flow	
Rain Date	Rain (in.)	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor	Peak (MGD)	Peaking Factor
02/04/18	1.02	0.003	0.94	0.159	1.01	0.004	1.19	0.094	0.82	0.049	1.15	0.023	1.22
02/11/18	1.37	0.004	1.08	0.356	2.27	0.006	2.11	0.116	1.01	0.106	2.46	0.026	1.39
03/02/18	1.20	0.004	1.02	0.291	1.85	0.004	1.42	0.122	1.06	0.076	1.78	0.018	0.99
04/16/18	2.03	0.005	1.54	0.368	2.34	0.006	1.99	0.131	1.14	0.095	2.21	0.028	1.51
05/13/18	1.02	0.004	1.14	0.150	0.96	0.003	1.16	0.095	0.83	0.044	1.01	0.022	1.17
05/17/18	1.12	0.005	1.41	0.266	1.69	0.004	1.21	0.115	1.00	0.063	1.46	0.021	1.15
05/27/18	1.17	0.003	0.77	0.147	0.93	0.003	0.89	0.111	0.96	0.036	0.85	0.017	0.89
06/10/18	2.44	0.004	1.16	0.151	0.96	0.003	1.09	0.114	0.99	0.045	1.06	0.023	1.23
06/11/18	1.81	0.004	1.20	0.416	2.65	0.004	1.33	0.160	1.39	0.094	2.19	0.026	1.38
07/22/18	1.26	0.003	0.85	0.165	1.05	0.003	1.06	0.108	0.94	0.046	1.07	0.023	1.23
07/25/18	1.02	0.003	0.87	0.170	1.08	0.002	0.80	0.113	0.98	0.047	1.09	0.024	1.28
08/11/18	1.99	0.002	0.57	0.127	0.81	0.003	0.90	0.096	0.83	0.035	0.82	0.019	1.00
08/13/18	3.51	0.004	1.18	0.321	2.05	0.005	1.71	0.130	1.13	0.077	1.80	0.029	1.54
09/07/18	1.80	0.003	0.99	0.147	0.94	0.003	1.00	0.107	0.94	0.038	0.88	0.019	1.01
09/08/18	1.04	0.003	0.93	0.253	1.61	0.004	1.44	0.133	1.16	0.060	1.41	0.022	1.18
09/09/18	1.44	0.004	1.10	0.319	2.03	0.005	1.75	0.151	1.31	0.078	1.81	0.026	1.37
09/18/18	1.10	0.004	1.03	0.169	1.07	0.005	1.86	0.134	1.17	0.042	0.98	0.019	1.03
09/25/18	1.51	0.005	1.29	0.250	1.59	0.004	1.46	0.128	1.11	0.058	1.35	0.022	1.15
09/28/18	1.31	0.004	1.09	0.306	1.95	0.005	1.63	0.165	1.44	0.066	1.54	0.020	1.08
10/27/18	1.01	0.003	0.91	0.209	1.33	0.003	0.97	0.109	0.95	0.051	1.20	0.021	1.10
11/15/18	1.21	0.004	1.06	0.207	1.32	0.004	1.31	0.141	1.23	0.057	1.32	0.018	0.97
11/24/18	2.00	0.004	1.24	0.318	2.02	0.005	1.77	0.161	1.40	0.093	2.17	0.029	1.56
12/16/18	1.04	0.005	1.30	0.298	1.90	0.005	1.68	0.125	1.09	0.079	1.84	0.028	1.51
12/21/18	1.11	0.005	1.30	0.499	3.18	0.006	1.88	0.179	1.56	0.129	3.00	0.026	1.37
12/28/18	1.29	0.004	1.00	0.347	2.21	0.005	1.68	0.168	1.46	0.089	2.08	0.023	1.23
Yearly Avg Flow (MGD) =		**0.004**		**0.157**		**0.003**		**0.115**		**0.043**		**0.019**	
Meter Max (MGD) =		**0.140**		**2.100**		**0.140**		**1.400**		**0.490**		**0.560**	
High Peaking Factor =			**1.54**		**3.18**		**2.11**		**1.56**		**3.00**		**1.56**
Average Peaking Factor =			**1.08**		**1.63**		**1.41**		**1.12**		**1.54**		**1.22**

Exhibit I

Easttown Municipal Authority

1-Inch Plus Rainfall Versus Flow

At Large Metered Pump Stations - Graphs

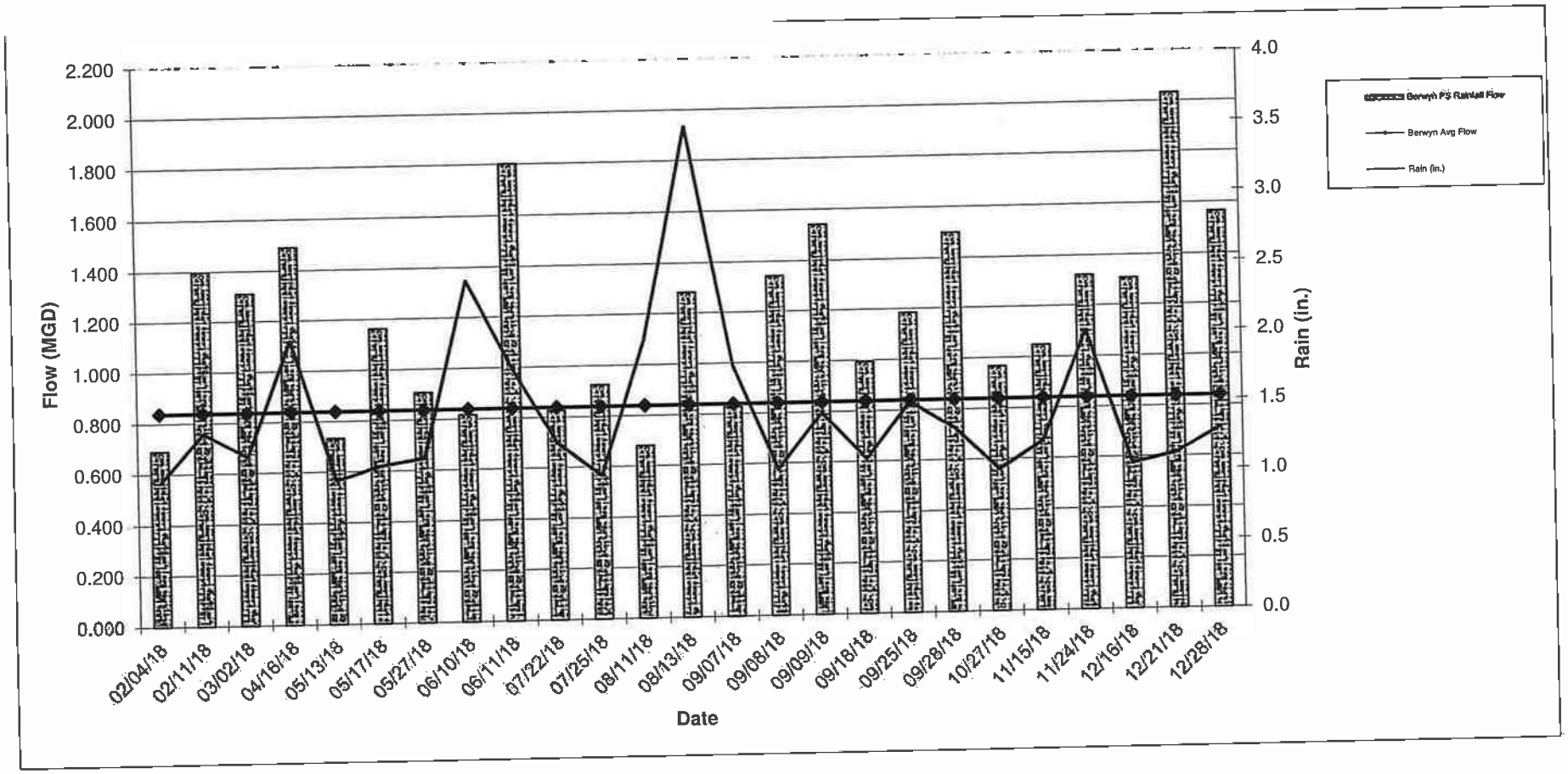
Berwyn Pump Station
Daylesford Pump Station
Saybrook Pump Station

Graphs 5A, 5B and 5C

GRAPH - #5A

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

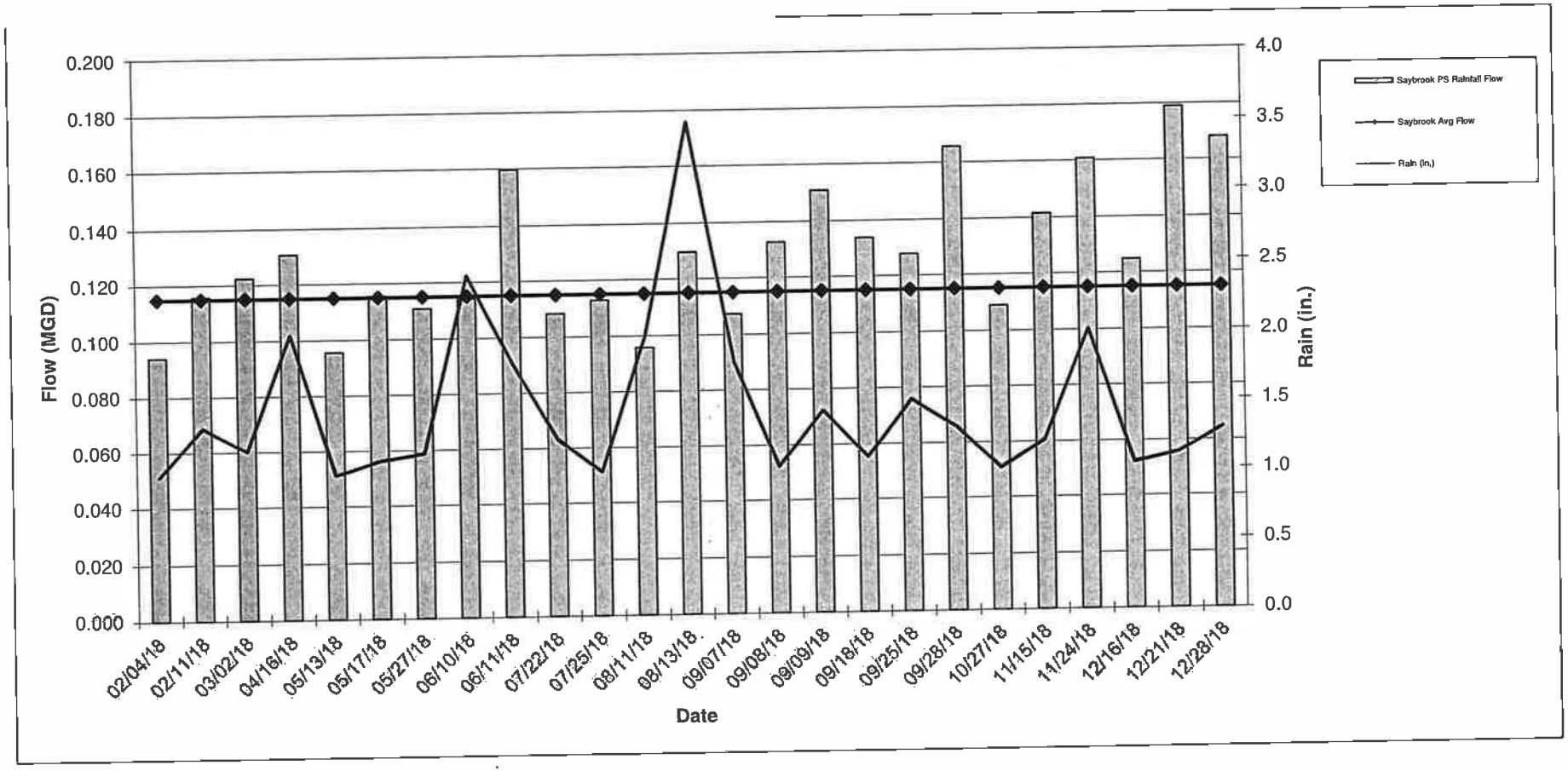
BERWYN PUMP STATION



GRAPH - #5C

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

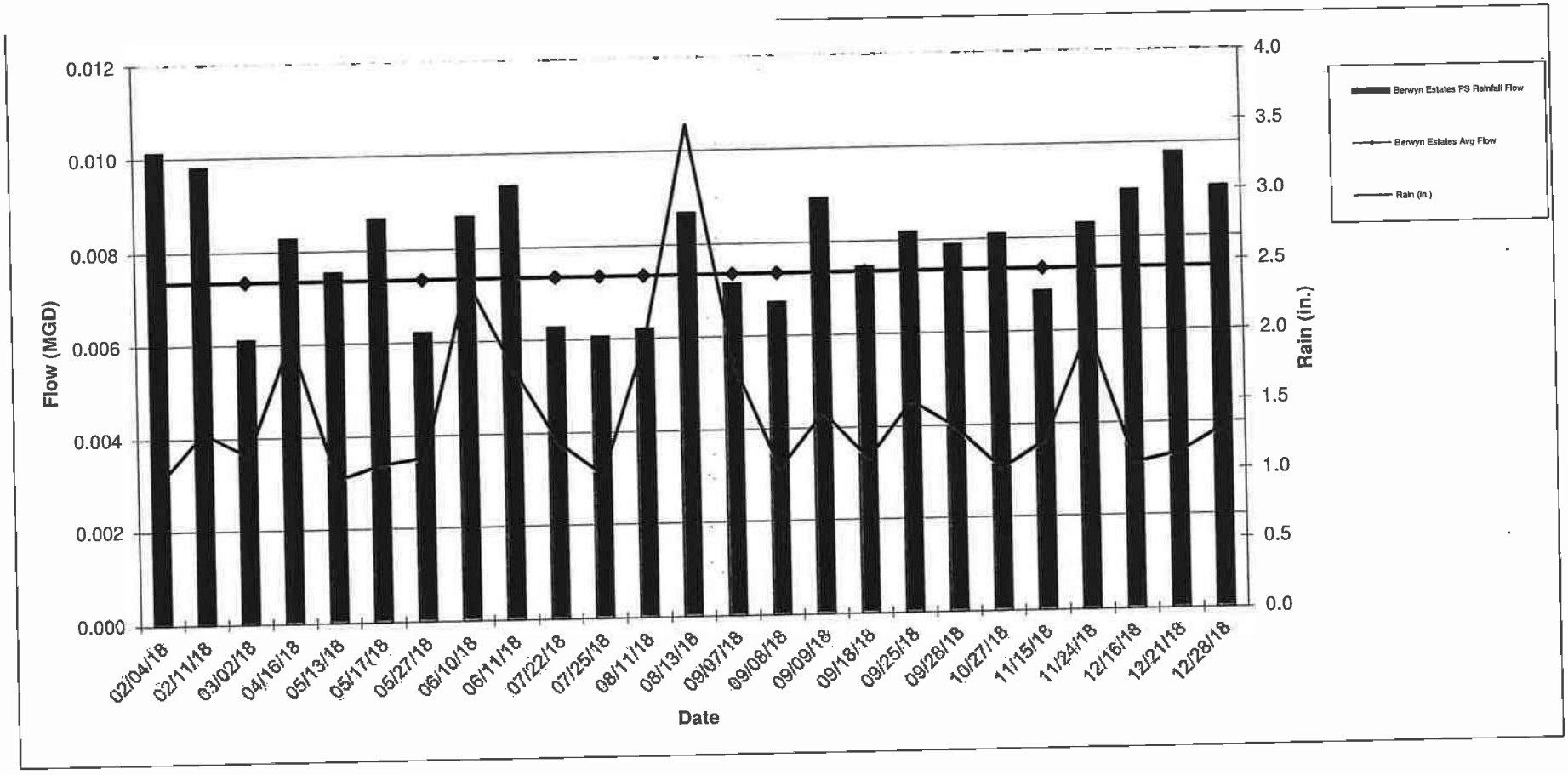
SAYBROOK PUMP STATION



GRAPH - #6A

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

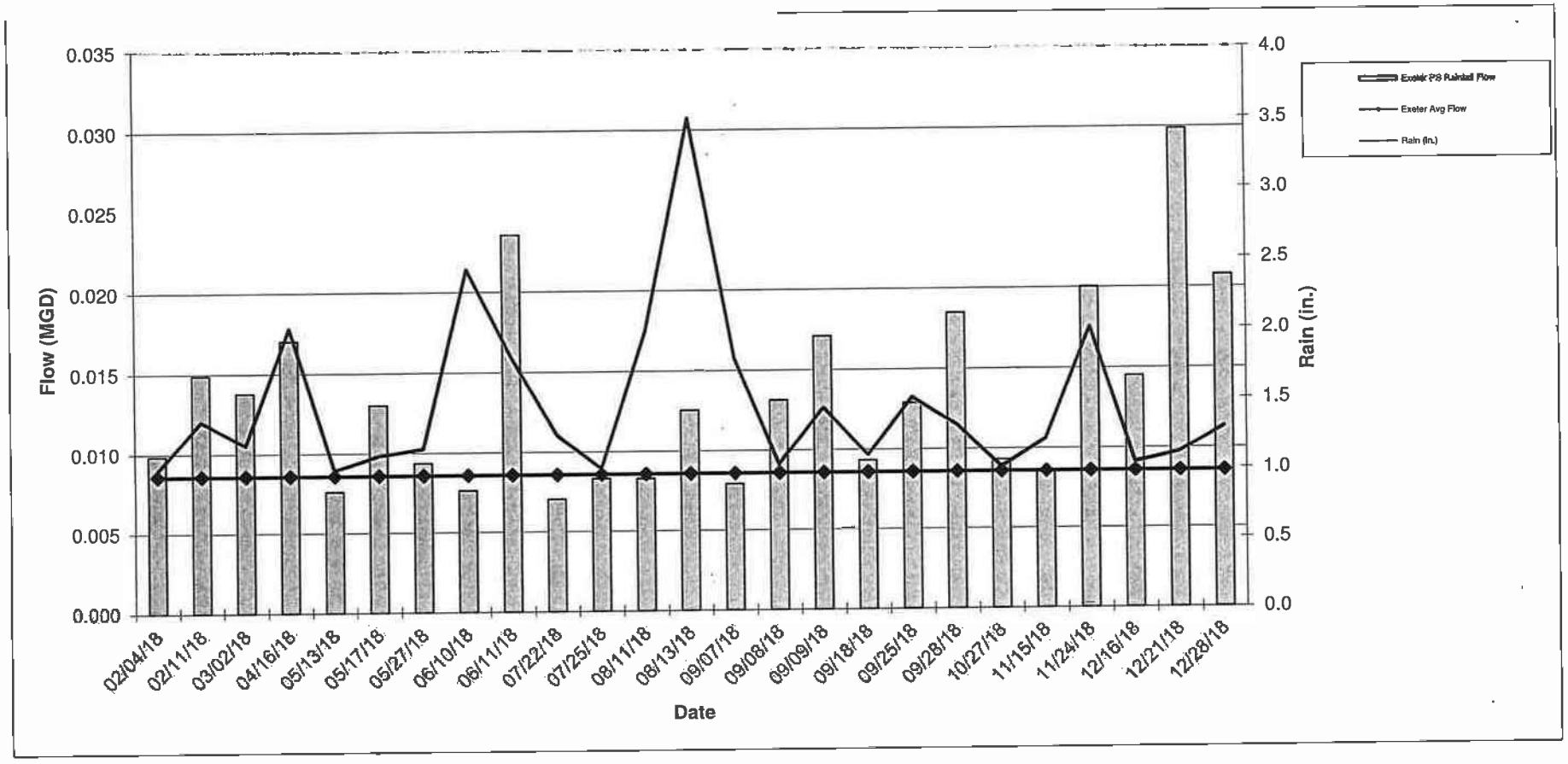
BERYWN ESTATES PUMP STATION



GRAPH - #6C

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

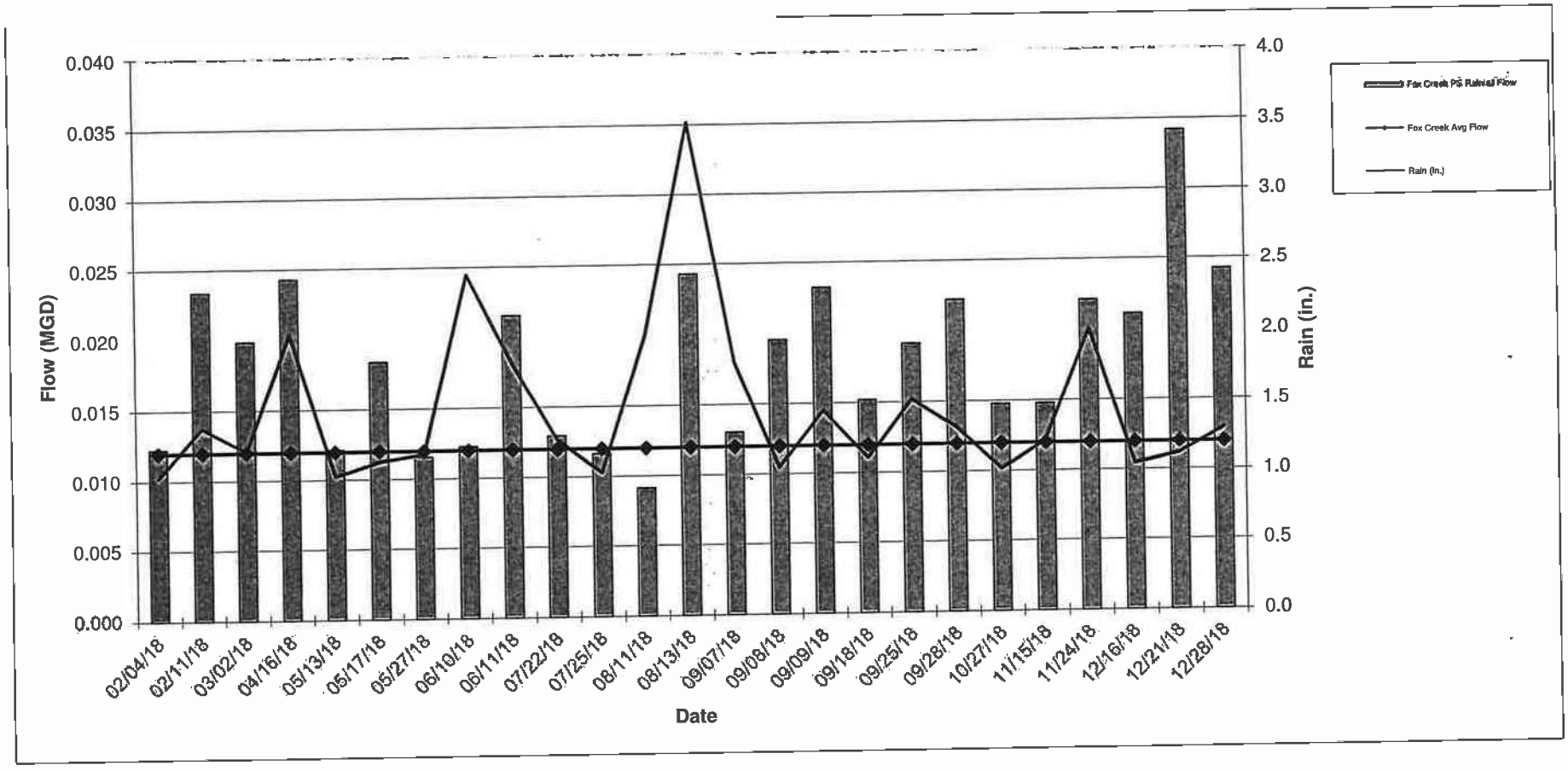
EXETER PUMP STATION



GRAPH - #6D

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

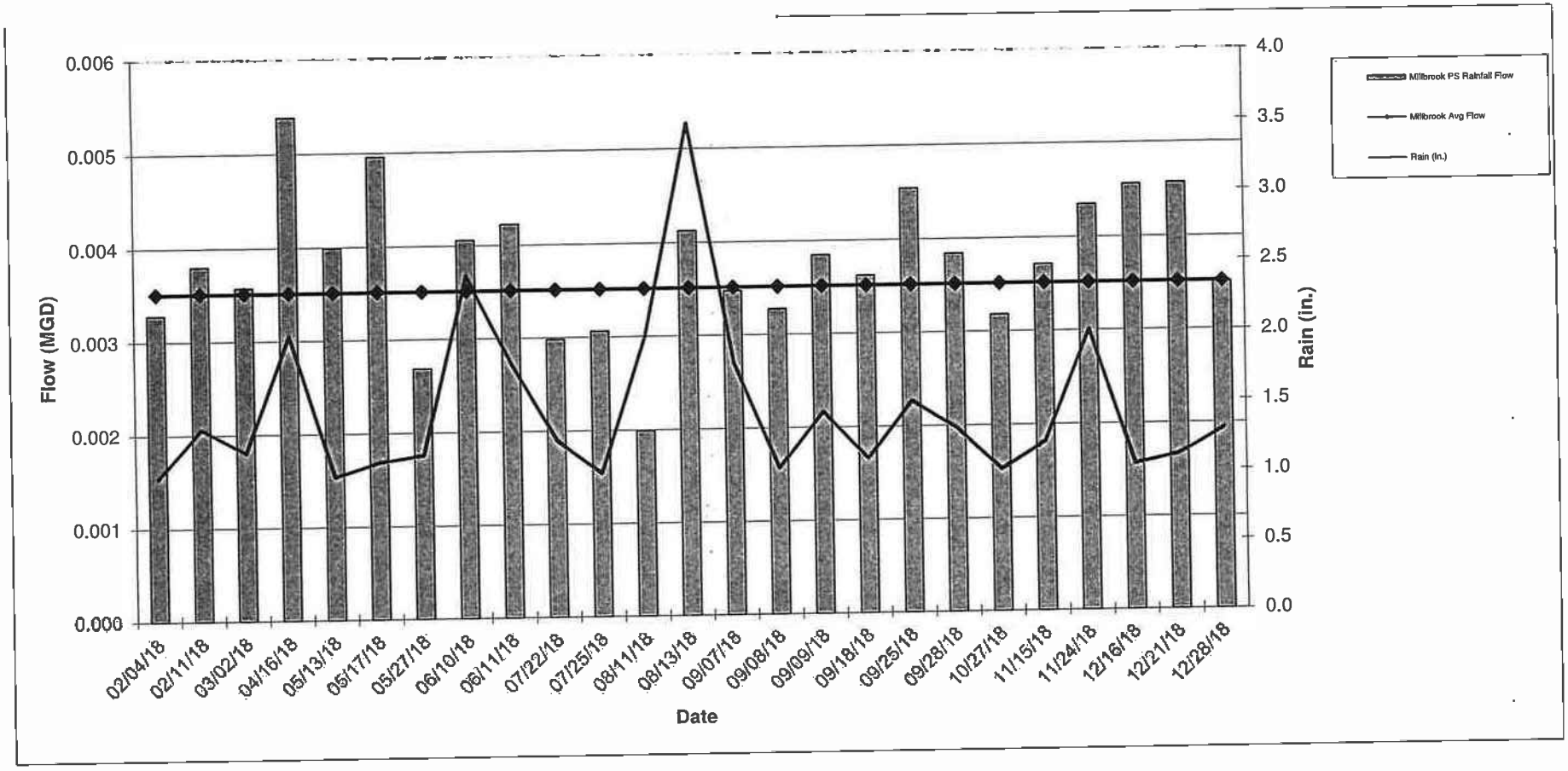
FOX CREEK PUMP STATION



GRAPH - #6E

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

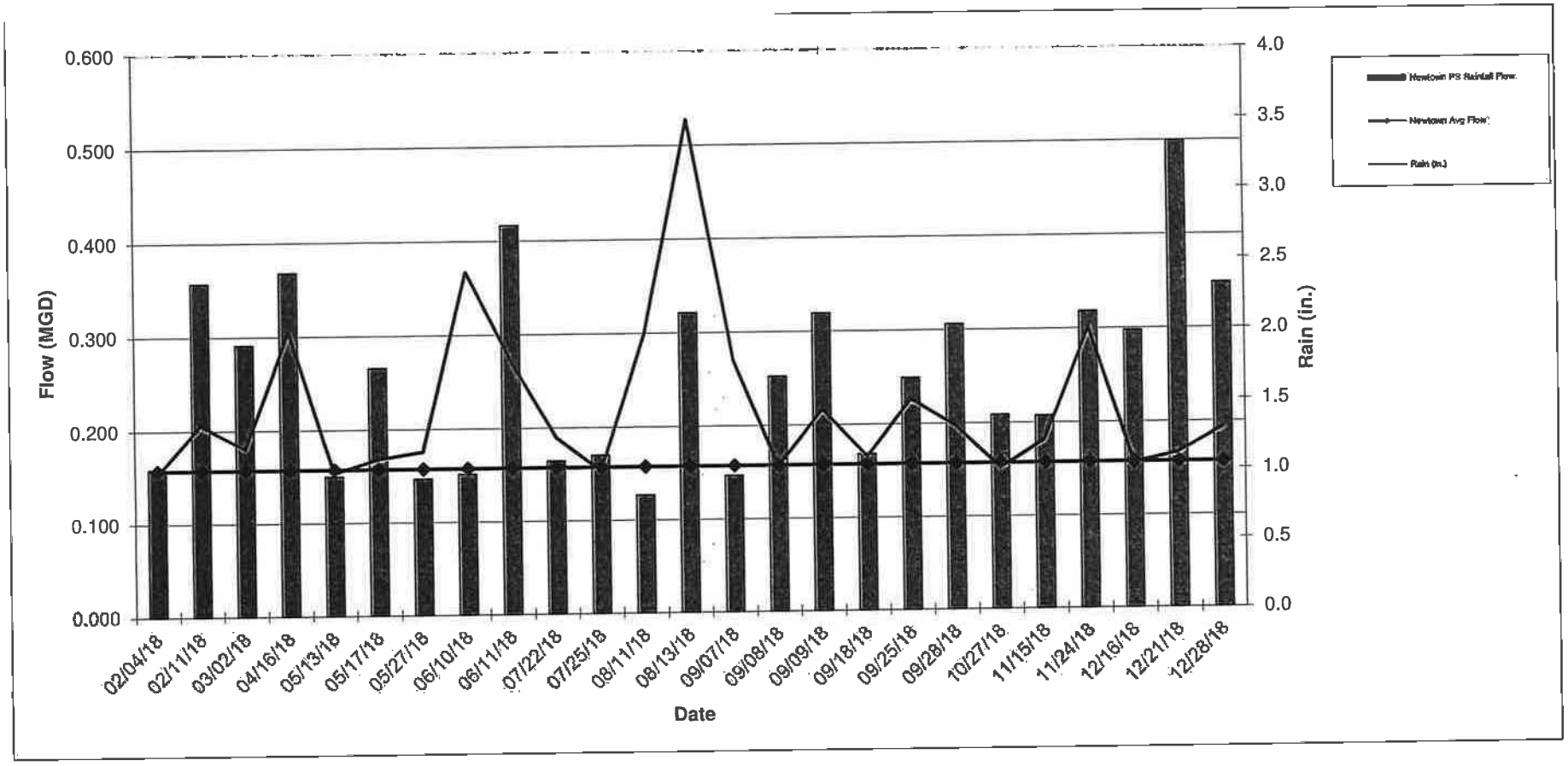
MILLBROOK PUMP STATION



GRAPH - #6F

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

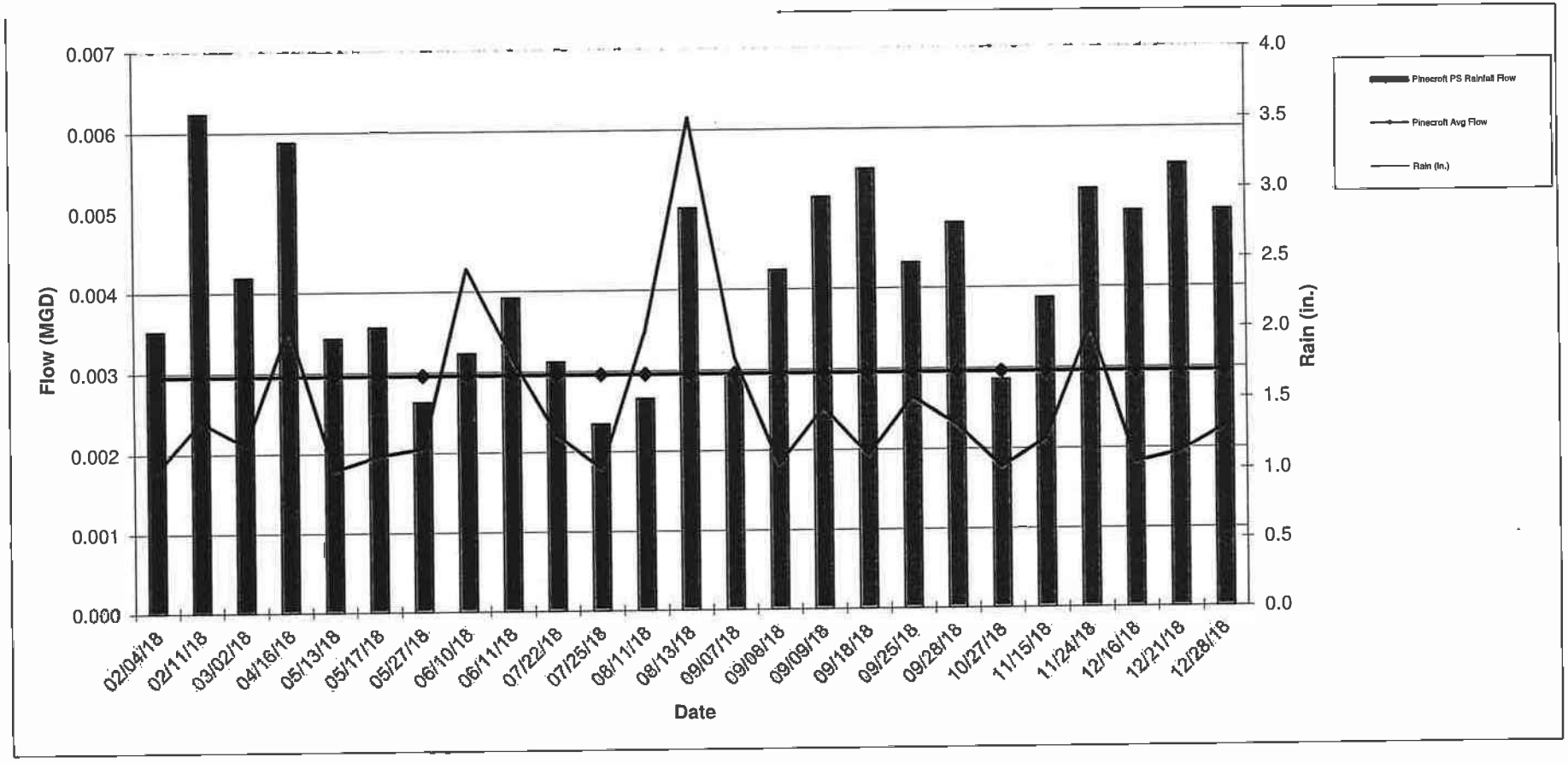
NEWTOWN PUMP STATION



GRAPH - #6G

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

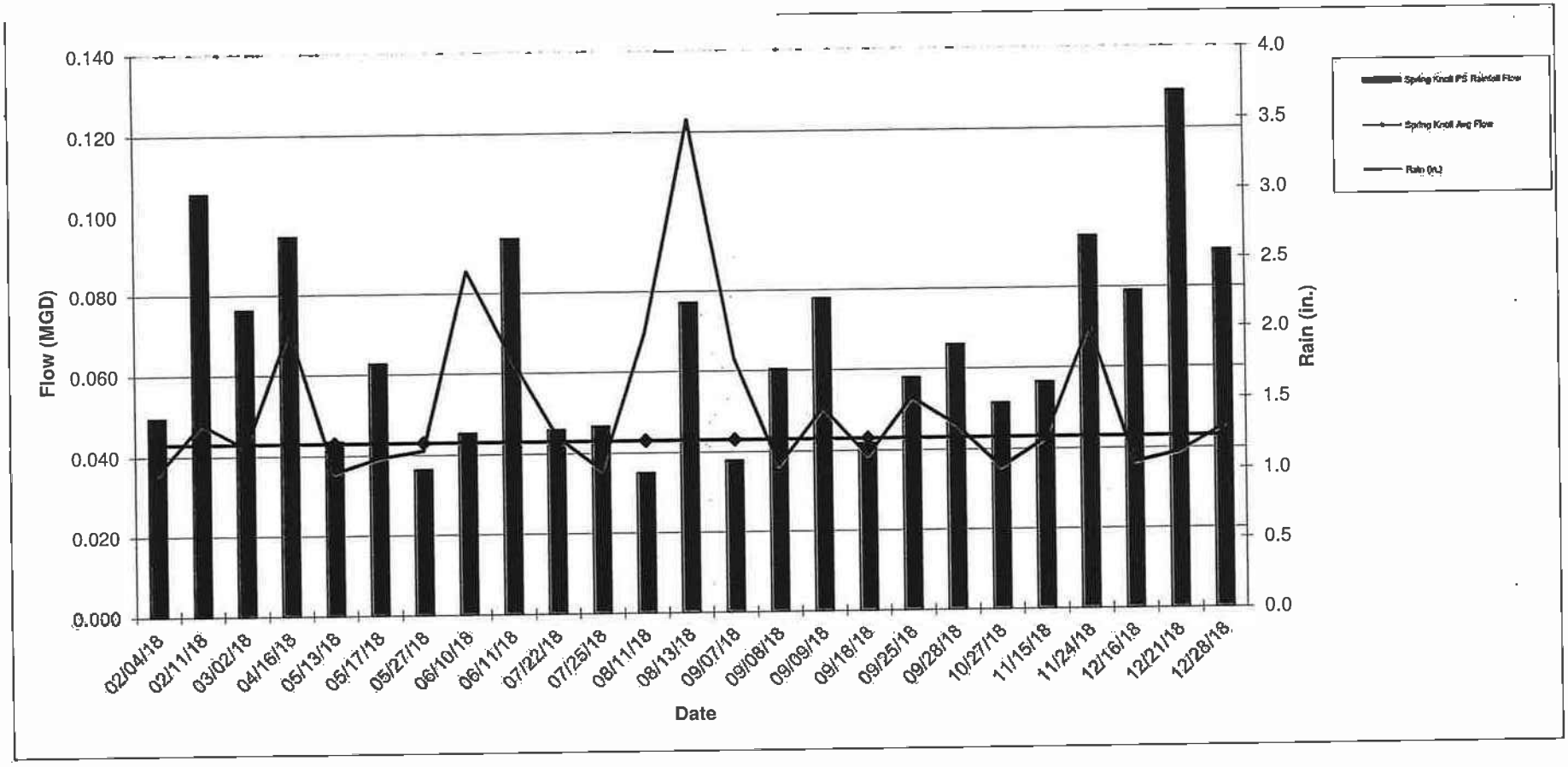
PINECROFT PUMP STATION



GRAPH - #6H

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

SPRING KNOLL PUMP STATION



GRAPH - #6I

EASTTOWN MUNICIPAL AUTHORITY
2018 ANNUAL CHAPTER 94 REPORT
1 INCH PLUS RAINFALL VERSUS FLOW

THE GREENS PUMP STATION

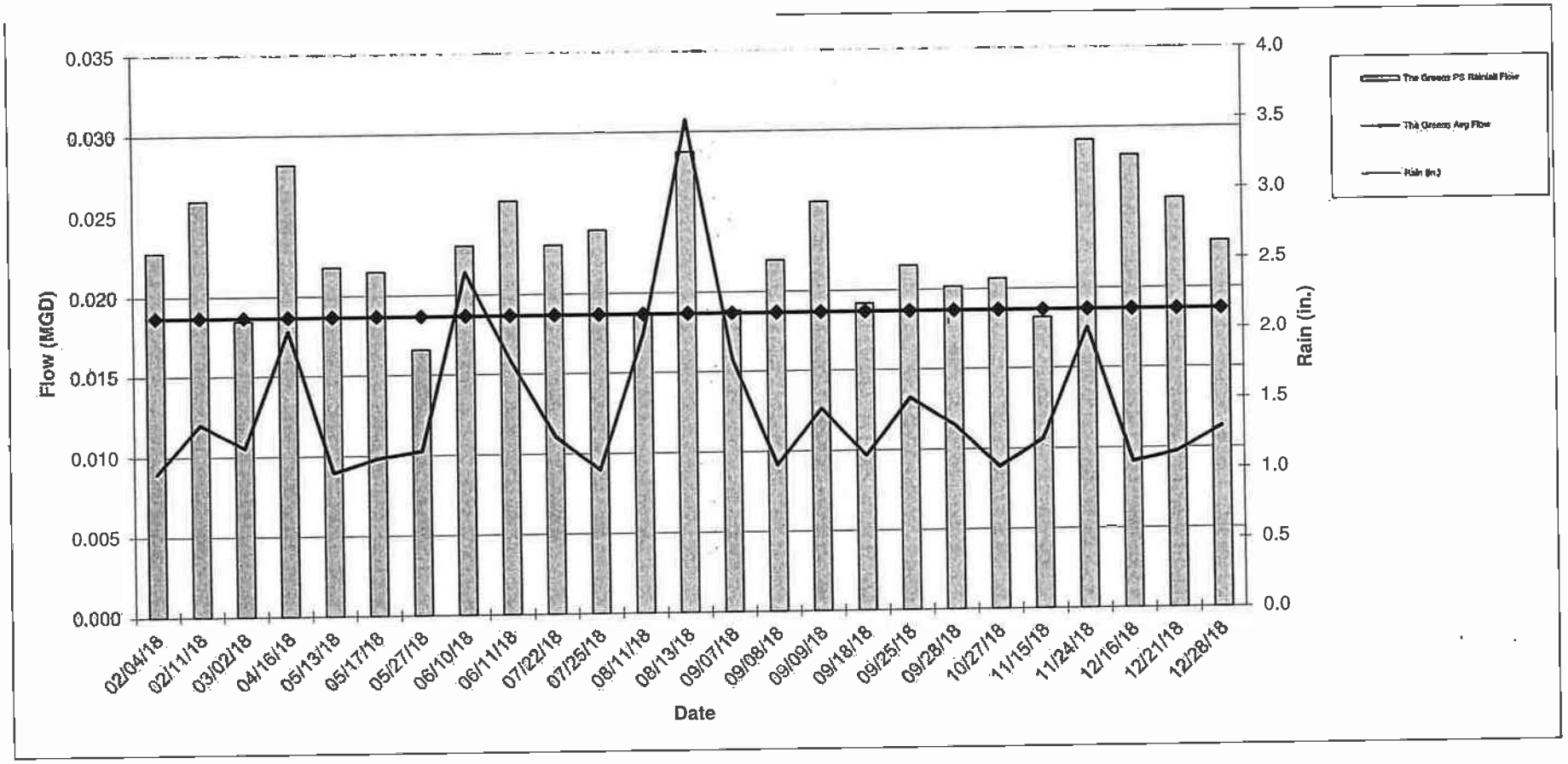


Exhibit K

Easttown Municipal Authority

Pump Station Flow Meter

Calibration Reports

EASTTOWN Twp.

CALIBRATION SCHEDULE:

Section B: Equipment calibrated quarterly (EASTTOWN Township)

Date: First Quarter 2018 Calibration Data

"Section B"

Easttown Township (610-687-3000) Garage: 610-495-5841 (Eddie cell) 610-656-2534
Daylesford Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Endress Hauser
Model #: Pro Mag 50
Serial #: L406F616000
Cal: 1.0969-9
Max Flow: 1200GPM

Date of Calibration:	02-06-18
% of Error:	less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Daylesford Pump Station
Recorder
Instrument Data:

Manufacture: Endress Hauser
Model #: RSG40
Serial #: L503EB04267
Chart: 0-1200GPM
Tot x 1

Date of Calibration:	02-06-18
% of Error:	less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Endress Hauser
Model #: Pro Mag 50
Serial #: HC045B16000
Cal: 2.627 9+2
Max Flow: 2500GPM
Tot x 1

Date of Calibration:	02-06-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Recorder
Instrument Data:

Manufacture: Endress Hauser
Model #: 6400
Serial #: 76B4109J4
Chart: 0-2500GPM

Date of Calibration:	02-06-18
Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Rosemount
Model #: 8712C
Max Flow: 1000 GPM
Serial #0860156434
Output: 4-20 MADC

Date of Calibration:	02-06-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Recorder / Totalizer
Instrument Data:

Manufacturer: Honeywell
Model #: DR 4300
Serial #: 0336Y360322600001
Counter: Electronic Totalize X 100
Chart: 0-100
Max Flow: 0-1000 GPM

Date of Calibration:	02-06-18
% of Error:	Less than .2%
Comments:	none
Corrective Action	none

EASTTOWN Twp.

CALIBRATION SCHEDULE:

Section B: Equipment calibrated quarterly (EASTTOWN Township)

Date: Second Quarter 2018 Calibration Data

"Section B"

Easttown Township (610-687-3000) Garage: 610-495-5841 (Eddie cell) 610-656-2534
Daylesford Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Rosemount
Model #: 8712C
Serial #: 0860128428
Cal: 100015010000000
Max Flow: 1000 GPM

Date of Calibration:	05-22-18
% of Error:	less than .2%
Comments:	Under Warranty
Corrective Action:	none

Easttown Township
Daylesford Pump Station
Recorder
Instrument Data:

Manufacture: Honeywell
Model #: DR 4300
Serial #: 0202Y253412100001
Counter: Electronic Totalize X 100
Chart: 0-1000 GPM

Date of Calibration:	05-22-18
% of Error:	Less than .2%
Comments:	Under Warranty
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Endress Hauser
Model #: Pro Mag 50
Serial #: HC045B16000
Cal: 2.627 9+2
Max Flow: 2500GPM
Tot x 1000

Date of Calibration:	05-22-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Recorder
Instrument Data:

Manufacture: Endress Hauser
Model #: 6400
Serial #: 76B4109J4
Chart: 0-2500GPM

Date of Calibration:	05-22-18
Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Rosemount
Model #: 8712C
Max Flow: 1000 GPM
Serial #0860156434
Output: 4-20 MADC

Date of Calibration:	05-22-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Recorder / Totalizer
Instrument Data:

Manufacturer: Honeywell
Model #: DR 4300
Serial #: 0336Y360322600001
Counter: Electronic Totalize X 100
Chart: 0-100
Max Flow: 0-1000 GPM

Date of Calibration:	05-22-18
% of Error:	Less than .2%
Comments:	none
Corrective Action	none

EASTTOWN Twp.

CALIBRATION SCHEDULE:

Section B: Equipment calibrated quarterly (EASTTOWN Township)

Date: Third Quarter 2018 Calibration Data

"Section B"

Easttown Township (610-687-3000) Garage: 610-495-5841 (Eddie cell) 610-656-2534
Daylesford Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Endress Hauser
Model #: Pro Mag 50
Serial #: L406F616000
Cal: 1.0969-9
Max Flow: 1200GPM

Date of Calibration:	09-07-18
% of Error:	less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Daylesford Pump Station
Recorder
Instrument Data:

Manufacture: Endress Hauser
Model #: RSG40
Serial #: L503EB04267
Chart: 0-1200GPM
Tot x 1

Date of Calibration:	09-07-18
% of Error:	less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Endress Hauser
Model #: Pro Mag 50
Serial #: HC045B16000
Cal: 2.627 9+2
Max Flow: 2500GPM
Tot x 1

Date of Calibration:	09-07-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Berwyn Pump Station
Recorder
Instrument Data:

Manufacture: Endress Hauser
Model #: 6400
Serial #: 76B4109J4
Chart: 0-2500GPM

Date of Calibration:	09-07-18
Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Magnetic Flow meter
Instrument Data:

Manufacturer: Rosemount
Model #: 8712C
Max Flow: 1000 GPM
Serial #0860156434
Output: 4-20 MADC

Date of Calibration:	09-07-18
% of Error:	Less than .2%
Comments:	none
Corrective Action:	none

Easttown Township
Saybrook Road Pump Station
Recorder / Totalizer
Instrument Data:

Manufacturer: Honeywell
Model #: DR 4300
Serial #: 0336Y360322600001
Counter: Electronic Totalize X 100
Chart: 0-100
Max Flow: 0-1000 GPM

Date of Calibration:	09-07-18
% of Error:	Less than .2%
Comments:	none
Corrective Action	none

TOWNSHIP OF
HAVERFORD
DELAWARE COUNTY

1014 DARBY ROAD
HAVERTOWN, PA 19083-2251
(610) 446-1000

Manager 610-446-1000 ext. 2208
Human Resources 610-446-1000 ext. 2233

HAVT 13202

March 4, 2019

Mr. Steve O'Neil, Chief, Operations Section
PA DEP, Clean Water
Southeast Regional Office
Two East Main Street
Norristown PA 19401-4915

RE: Township of Haverford
2018 Chapter 94 Report
Darby Creek Basin

Dear Mr. O'Neil:

On behalf of the Township of Haverford, please find enclosed two (2) copies of the 2018 Chapter 94 Annual Report for the Township's sewerage facilities within the Darby Creek Basin.

Should you have any questions concerning this, please feel free to contact the undersigned.

Sincerely,

PENNONI ASSOCIATES INC.

David Pennoni, PE
Township Engineer

DP/rkm
cc: Eric Ponert, S.E.O., City of Philadelphia Water Department, w/encl.
Larry J. Gentile, Township Manager, w/encl.
Dave Adams, Radnor-Haverford-Marple Sewer Authority, w/encl.
Robert Willert, DELCORA w/encl. ✓
Charles J. Catania Jr., P.E., Catania Engineering Associates, Inc., w/encl.

MUNICIPAL WASTELOAD MANAGEMENT
2018 ANNUAL REPORT

FOR

HAVERFORD TOWNSHIP
DELAWARE COUNTY, PA

"DARBY CREEK BASIN"

Prepared by:
PENNONI ASSOCIATES INC.
1900 Market Street, Suite 300
Philadelphia, PA 19103

HAVT 13202

February 2019

SIGNATURE PAGE

PERMITTEE:

NAME: Larry J. Gentile, Township Manager

ORGANIZATION: Township of Haverford

ADDRESS: Township Building
1014 Darby Road
Havertown, PA 19083-2251

PHONE: (610) 446-1000

This Chapter 94 Report prepared by Pennoni Associates Inc. has been reviewed and, as permittee, I am satisfied with its content.

AUTHORIZED SIGNATURE: _____ DATE: 2/22/19
TITLE: Township Manager

PREPARER:

NAME: David Pennoni, PE

ORGANIZATION: Pennoni Associates Inc.

ADDRESS: 1900 Market Street, Suite 300
Philadelphia, PA 19103

PHONE: (215) 222-3000

This report has been prepared in accordance with Title 25, Part 1, Subpart C, Article 11, Chapter 94, of the Commonwealth of Pennsylvania Regulations.

AUTHORIZED SIGNATURE: _____ DATE: 2-22-19
TITLE: Township Engineer

MUNICIPAL WASTELOAD MANAGEMENT
2018 ANNUAL REPORT
"DARBY CREEK BASIN"

HAVERFORD TOWNSHIP
DELAWARE COUNTY, PA

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MUNICIPAL WASTELOAD MANAGEMENT
2018 ANNUAL REPORT
"DARBY CREEK BASIN"

HAVERFORD TOWNSHIP
DELAWARE COUNTY, PA

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- R-H-M's Monthly Flow Data (2014 thru 2018)
- Exhibit 1 Haverford Township Inflow and Infiltration Abatement Program
- Exhibit 2 Haverford Township Sewer System

MUNICIPAL WASTELOAD MANAGEMENT
2018 ANNUAL REPORT
"DARBY CREEK BASIN"

HAVERFORD TOWNSHIP
DELAWARE COUNTY, PA

1.0 INTRODUCTION

This Report is submitted in compliance with the latest regulation set forth under Title 25, Part I, Subpart C, Article II, Chapter 94 Municipal Wasteload Management Regulations of the Pennsylvania Department of Environmental Protection (PaDEP) concerning sewerage facilities.

1.1 Delineation of Sewerage Service Areas

Haverford Township (Township) borders Springfield Township and Upper Darby Township to the south, Marple Township to the west, Radnor Township to the northwest, Lower Merion Township to the northeast, and the City of Philadelphia to the southeast. The Township is primarily residential; however, the Township zoning ordinance allows for a number of other land uses including retail/commercial, office, light industrial, institutional, and open space. The topography of the Township is defined primarily by two (2) drainage basins, the Cobbs Creek and Darby Creek Drainage Basins. The Cobbs Creek Drainage Basin contains approximately sixty-five percent (65%) of the Township's sewer mains (100-miles) with gravity sewer interconnection to Upper Darby, Radnor, and Lower Merion Townships' sewer collection system. Similarly, the Darby Creek Drainage Basin contains approximately thirty-five percent (35%) of the Township's sewer mains (50-miles) with gravity sewer interconnections to Radnor-Haverford-Marple (R-H-M) system and Upper Darby Townships' sewer collection and conveyance system. The size of the entire Township is approximately 10.01 square miles.

The Township does not own a wastewater treatment facility or a sewage pump station; however, the Township does own and maintain their sanitary sewer collection system consisting of approximately 150-miles of sewers. The existing sewers are separated from the storm sewers in the Township. The Township has Sewer Agreements either directly

or indirectly with surrounding (downstream) municipalities and authorities such as Upper Darby, Radnor-Haverford-Marple Sewer Authority (R-H-M), Darby Creek Joint Authority (DCJA), and Delaware County Regional Water Quality Control Authority (DELCORA). The agreements are to provide for the sewer collection and conveyance of wastewater into the City of Philadelphia for treatment at the Southwest Water Pollution Control Facility. These Agreements establish the following items: terms of the relationship; identify connection points; address flow, loading and billing information; and other necessary requirements for the Township's portion of wastewater which passes through the downstream municipalities. The Township also established Agreements to convey wastewater flow generated in both Lower Merion Township and Radnor Township.

This Report will address **only the Darby Creek Drainage Basin** with the Cobbs Creek Drainage Basin discussed under a separate report.

1.2 Description of Existing Sewage Facilities

1.2.1 Collection System

The Darby Creek Drainage Basin covers approximately 35-percent of the Township land area. Approximately 75% of the Haverford Township Sanitary Sewer System was constructed between 1950 and 1970, aged at approximately 47 to 67 years. Most of the remaining system was constructed between 1970 and 1990, aged at approximately 27 to 47 years. A few extensions have been completed since 1990. A North-South ridge line across the Township divides the Darby Creek Drainage Basin from the Cobbs Creek Drainage Basin. Given the age of the system, a complete inventory of the sewers in the Township is not available. However, as new or repaired sewer projects are performed, sewer segments are documented for pipe size, material, and length. The Township Sewer Map enclosed in the Appendices (Exhibit 2) reflects the overall sewer system.

Within the Darby Creek Drainage Basin, the sewer collection system is comprised of approximately 50-miles of pipe servicing of approximately three and one-half (3 1/2) square miles. Below is an estimated inventory of the sewers:

Material	Length of Sewers	
VCP	237,600 l.f.	45-miles
DIP	13,200 l.f.	2.5-miles
Transite	13,200 l.f.	2.5-miles

Diameter	Length of Sewers	
8-inch	250,800 l.f.	47.5-miles
10-inch	7,920 l.f.	1.5-miles
12-inch	5,280 l.f.	1-mile

Age	Length of Sewers	
38-58 years	240,000 l.f.	45.5-miles
19-37 years	18,000 l.f.	3.4-miles
1-18 years	6,000 l.f.	1.1-mile

The Darby Creek Drainage Basin consists solely of collector sewers; no Township owned interceptor(s) exist. The collector sewers are predominantly composed of 8-inch diameter pipe with some 10 and 12-inch diameter sewers. As depicted in Exhibit 2, the collector sewers within Darby Creek Basin are primarily tributary to two (2) parallel interceptors along Darby Creek, owned and operated by the R-H-M Sewer Authority. The exception to this is in the following two (2) areas: 1) the southern-most portion of the basin that drains by gravity into the Upper Darby Township system and 2) a small northwestern portion of the basin where most of the sewerage drains by gravity into Radnor Township's system. In addition, there are small pockets of residential properties, primarily on Marple and Darby Roads, in the northeast portion of the Township which still have on-lot disposal systems.

The majority of the Darby Creek Drainage Basin flows from the North-South ridge line towards the Darby Creek, and into the R-H-M's interceptors via nine (9) separate connection points along the interceptors. The interceptors, 24-inch and 30-inch diameter RCP pipe, follow the western border of the Township for its full length, parallel to the Darby Creek. The Township shares a percentage of

sewer capacity flow with four (4) other municipalities that also connect to the interceptors. The municipalities are Radnor, Marple, Newtown, and Tredyffrin Townships.

1.2.2 Pumping Stations

There are no Township owned pump stations in the Darby Creek Drainage Basin. There is, however, one (1) privately owned pump station located in the basin which discharges into the Township's gravity sewer system. The private station is located on Scarlet Oak Drive, and serves 14 existing single family homes. The station was built in the 1980's.

2.0 HYDRAULIC & ORGANIC LOADINGS [§ 94.12.Sec. (a) (1), (2)]

Haverford Township does not own a sewage treatment plant;

3.0 BASIS OF HYDRAULIC & ORGANIC PROJECTIONS [§ 94.12.Sec. (a) (3)]

Haverford Township does not own a sewage treatment plant;

4.0 SEWER EXTENSIONS [§ 94.12Sec. (a) (4)]

Development within the Township is occurring at a slow pace, mostly due to the Township being "built-out". Over the years, the majority of new sewer connections have been either "infill" development (adding laterals to existing mains) or connection of new homes at Haverford Reserve.

The following is a summary of new/proposed sewer extensions in 2018 for the Darby Creek Drainage Basin:

- There were no sewer extensions constructed in 2018.
- There were no exempted sewer extensions in 2018.
- There were no pending sewer extensions with planning approval in 2018.
- There were no pending sewer extensions without planning approval in 2018.

5.0 SEWER SYSTEM MONITORING, MAINTENANCE, REPAIR, & REHABILITATON [§ 94.12.Sec. (a) (5)]

The Township inspects for illegal connections to the sanitary sewers (sump pumps, basement drains, foundation drains, etc.) and has an Inflow and Infiltration Abatement Program in place. This program also includes a public education program to further educate residents regarding illegal connections. A copy of the Abatement Program and handout is located in Exhibit 1.

During 2018, four (4) illegal sump pump connection was removed in the Darby Creek Drainage Basin.

The Township has an ongoing preventative maintenance program. This program consists of preventive work such as cleaning and televising of the system to ascertain the condition of the sewer and identify problems. A 24-hour emergency response is provided. Complaints are investigated to determine responsibility and acted upon accordingly. There are a total of six (6) Township personnel who participate fully or partially in daily maintenance of the system. The Township also owns their equipment which includes a flush truck, a vac truck, and a T.V. truck equipped with video camera. This equipment enables the Township to perform routine maintenance such as video inspection, sewer jet cleaning, root cutting, etc.

The Township sewer operating fund has been established in part to fund the routine maintenance and repairs to the system. This work is performed on an as needed basis, either by the Township forces or private contractors. Larger emergency projects are typically funded from a number of different resources including from time to time special financing.

5.1 Maintenance

No sewer repairs were performed in 2018 within Darby Creek Drainage Basin. In the past 5-years, a total of five (5) repairs were completed. Below is the list of the projects and the year the work was performed.

Maintenance, Repair, & Rehabilitation

• 2014 – Steel Field – Replaced approximately 10 lf of deteriorated pipe	$12,000
• 2013 – Bon Air Avenue – Replaced 7 lf. of deteriorated main	$10,000
• 2013 – Fairview Avenue – Replaced 10 lf. of deteriorated main	$12,000
• 2012 – Merion (East) Golf Course – Replaced 20 lf. of pipe	$12,043
• 2011 - Bon Air & Grand Avenues – Repair of 6 lf. of sewer pipe	$5,460
Approximate Total:	**$51,503**

5.2 Monitoring: Infiltration/Inflow Program

The Township repairs sources of infiltration and inflow as they are discovered. Typically, this is completed through video inspection of the system. Also, the Township continues its Inflow and Infiltration Abatement Program as described in Section 5.0. In addition, the Radnor-Haverford-Marple Sewer Authority also works with the Township to identify and repair high inflow and infiltration areas. R-H-M provides tabulated copies of the monthly flow data relative to each meter location along the interceptors to the Township. Copies of R-H-M's Meter Calibration for the 9 meters along R-H-M's interceptor can be found in DELCORA's 2018 Chapter 94 Summary Report.

5.3 Monitoring: Engineering Studies

R-H-M in conjunction with the Township evaluates various sub-basins throughout the Darby Creek Basin via flow metering. Several areas have been identified in R-H-M's Wet Weather Inflow Abatement Program performed in 2010 as having significant inflow. The Township has further investigated several of these identified areas and has not identified any significant sources of I/I. However, the Township does continually monitor susceptible areas in an attempt to identify specific sources of inflow and infiltration.

Copies of any R-H-M's study reports can be found in DELCORA's 2018 Chapter 94 Summary Report.

6.0 CONDITION OF SEWER SYSTEM [§ 94.12.Sec. (a) (6)]

6.1 Population Statistics

The U.S. Census Bureau statistical data was used as a basis for the historical growth trend in the Township as shown in Table 1 below:

TABLE 1 - Historical Population Growth

Year	Haverford Township (100%)	Cobbs Creek (65%)	Darby Creek (35%)
2010 U.S. Census:	48,491	31,519	16,972
2014	48,698[1]	31,654	17,044
2015	48,804[1]	31,723	17,081
2016	48,893[1]	31,780	17,113
2017	49,089[2]	31,910	17,179
2018	49,196[2]	31,980	17,216

Note:
(1) Based on U.S. Census, ACS Demographic and Housing Estimate (2010-2016).
(2) Based on average population growth over past 5 years

Per the 2010 U.S. Census, the Township had experienced a slight increase in population in the past 5-year period. A population increase of 598 people has been estimated for the population trend between 2010 and 2018. In accordance with the 2010 U.S. Census, the average household size is 2.63.

Population forecast are provided by the Delaware Valley Regional Planning Commission's (DVRPC) Analytical Data Report for Regional, County, and Municipal Population 2010 - 2040, dated March 2013. These figures are listed in Table 2 below.

TABLE 2 - Population Forecast			
Year	**Haverford Township** (100%)	**Cobbs Creek** (65%)	**Darby Creek** (35%)
2010	48,491	31,519	16,972
2015	48,495	31,522	16,973
2020	48,508	31,530	16,978
2025	48,538	31,550	16,988
2030	48,568	31,569	16,999

Similar to the U.S. Census population trend for the past couple of years, the DVRPC figures forecast an increase in population; however, at a slower rate thru 2030. The Township population trend is expected to increase by an annual growth rate of 0.0053% between 2010 and 2030.

a. Historical and Present Sewer Flows

The Township does not perform flow monitoring. However, flows are continuously monitored by Radnor-Haverford-Marple-Sewer Authority (R-H-M) via twenty-one (21) meters along RHM's interceptors. Nine (9) of these meters recorded sewer flow at each connection in the Darby Creek system. These connections are shown on Exhibit 2. The meters are ultrasonic flow level recorders located inside a meter pit utilizing a flume to convert flow values. Readings are transmitted to R-H-M Operation Center on a daily basis via telemetry system.

Total flow through the interceptor is measured at R-H-M's meter location RHM-1. The total flow is divided amongst the five (5) contributing municipalities, including the Township, based on a percentage breakdown of the recorded flow data taken from the twenty-one (21) R-H-M meters. R-H-M provides a copy of the daily flow figures to each contributing municipalities in a monthly tabulation form. Accordingly, Table 3 shows monthly average wastewater flows for the Darby Creek Drainage Basin including total rainfall during 2018. The monthly flows ranged from 25.2 MG in January to 49.2 MG in

December of 2018. A copy of R-H-M's Monthly Flow Readings 2014 thru 2018 is provided in Appendices.

In addition, Table 3 shows historical (past 5 years) hydraulic flows metered for the Darby Creek Basin including monthly rainfall data. Based on these historical flows, a hydraulic ratio (peaking factor) was calculated.

b. Projected Sewer Flows

A. Projected Connections

During 2018, ten (10) new connections were made throughout the Basin. Development within the area is anticipated to continue at a similar rate over the next couple of years. Table 4 provides a summary of total projected connections anticipated to occur within the next five years. These projects are based on records of properties under construction, or awaiting Act 537 planning approval, and assume infill of approximately five (5) new equivalent dwelling units (EDUs) per year.

Of the ten (10) new connections made in 2018 within the Basin, five (5) connections were within the Haverford Reserve Development. This Development was ultimately planned to produce 71,882 GPD; with 47,752 GPD to be discharged to the Darby Creek Drainage Basin and the balance of 24,248 GPD anticipated to be conveyed to the Cobbs Creek basin via a pumping station. On February 25, 2013, the Township received PaDEP approval for the re-direction of an additional 13,185 gpd of sewage flows from the Cobbs Creek Basin to the Darby Creek Basin as a result of previous corrective I/I measures. Subsequently on February 22, 2018, the Township received PaDEP approval for the reduction in the ultimate sewage flow for the entire development from 71,882 gpd to 51,650 gpd and approval to discharge all flow to the Darby Creek Drainage Basin. It is anticipated that the complete build out of this development will occur within the next 1 to 4 years.

Accordingly, the Darby Creek 5-Year Hydraulic Loading projections are shown in Table 5.

Table 3

DARBY CREEK BASIN

HISTORICAL AND PRESENT SEWER FLOWS (2014 THROUGH 2018)

Description	2014	2015	2016	2017	2018
Average Monthly Volume [1] (MG)	34.1	27.1	26.4	24.5	34.7
Annual Average Flow (MGD)	1.121	0.891	0.868	0.803	1.141
Total Rainfall	47.09	46.15	37.50	40.79	66.21

Maximum Month Flow [1] (MGD)	1.768 (May)	1.161 (March)	1.039 (March)	0.937 (April)	1.587 (Dec)
Max. Month Total Rainfall (inches)	7.85" (April)	8.44" (June)	6.32" (May)	5.73" (May)	8.96" (Aug)
Hydraulic Ratio (Max Month/Annual Avg.)	1.58	1.30	1.20	1.17	1.39

5 -Year Hydraulic Ratio: **1.33**

5 -Year Hydraulic Annual Average Flow: **0.96**

NOTES:

(1) Based on RHM's summary of monthly total flow metered data in MG

Table 4
Projected Sewer Connections
Darby Creek Basin

Connections	PROJECTED CONNECTIONS (EDUs)				
	2019	2020	2021	2022	2023
I. Existng Infill Properties	5	5	5	5	5
II. Haverford Reserve:					
a. Condos - 2 buildings @ (33 units/bldg)[(1)]	17	16	17	16	-
Total:	**22**	**21**	**22**	**21**	**5**

NOTES:

(1) DEP approval letter dated 2/22/2018, allowed the Township to use a planning flow rate of 125 gpd/EDU for the remaining condos in the Haverford Reserve.

Table 5

5 -Year Hydraulic Loading Projections

Darby Creek Basin

Hydraulic Loading Projection							
Projected Years	Previous Year Annual Average Flow [1]	New Connection[2][5]	Unit Flow[3][5]	Increased Flow from New Connections	Projected Annual Average Flow	Hydraulic Ratio [4]	**Maximum Month Flow**
	(MGD)	(EDU)	(GPD/EDU)	(MGD)	(MGD)		**(MGD)**
2019	0.96	22	263	0.003	0.968	1.33	**1.285**
2020	0.97	21	263	0.003	0.972	1.33	**1.289**
2021	0.97	22	263	0.003	0.975	1.33	**1.294**
2022	0.98	21	263	0.003	0.978	1.33	**1.298**
2023	0.98	5	263	0.001	0.980	1.33	**1.300**

NOTES:

(1) The 2018 previous year annual average flow starts with the previous 5 -Year Hydraulic Annual Average Flow; See Section 5.3B.

(2) See Table 4 - Projected Sewer Connection Summary

(3) Unit Flow of 263 GPD/EDU; Per the 2010 U.S. Census of 2.63 people per household * 100 gpd

(4) 5-year Hydraulic Ratio; See Table 3

(5) DEP approval letter dated 2/22/2018, allowed the Township to use a planning flow rate of 125 gpd/EDU for the remaining condos in the Haverford Reserve.

B. Basis for Projected Hydraulic Loading

The projected annual average flow at the end of the next five year period is estimated to be 0.980 MGD. The projected annual average flows (2019 thru 2023) for the Darby Creek Drainage Basin in Table 5 are based upon Table 4 projected connections added to the previous year's annual average flow for the next 5 years. New EDU connections are multiplied by a unit flow of 263 gallons per day per EDU. The unit flow is based on the 2010 census data of 2.63 people per residence at 100 gallons per day per person. On February 22, 2018, the Township received PaDEP approval to use 125 gallons per day per EDU for planning purposed in connection to the remaining condominiums at the Haverford Reserve development.

Likewise, the maximum monthly average flow projections (2019 to 2023) from the Darby Creek Drainage Basin in Table 5 were calculated by multiplying 2018 Average Hydraulic Ratio of 1.33 times the projected annual average flow. The projected maximum monthly average daily flow at the end of the next five-year period is estimated to be 1.300 MGD.

In summary, the overall present condition of the sewer collection system is good, and the overall capacity of the Township's sanitary sewer collection system is adequate for present and projected flows identified. Currently, there are no problematic sewered areas where conveyance capacity is being or will be exceeded within the next five years. Also, the Township's preventive maintenance program described in Section 5.0 will help identify problem areas.

There are no known or reported sections of sewer which surcharged during dry or normal wet weather flow events.

In accordance with the PA-DEP's Chapter 94, Municipal Wasteload Management Corrective Action Plan and Connection Management Plan Information Sheet, a ratio of the peak instantaneous flow to the annual average flow should be analyzed to determine the effectiveness of I&I abatement efforts. Daily flow data from each of the nine (9) R-H-M permanent flow meters was unavailable during preparation of this Report;

therefore, R-H-Ms monthly flow data, located in the Appendices, was used to determine the effectiveness of I&I abatement efforts. In Table 3, the ratio of the max month flow to the annual average flow was calculated in each of the past 5 years. The ratio remains under the 2014 levels after rising to 1.58.

6.4 Discussion of Repaired, Replaced, or Rehabilitated Sewers

There were no portions of the sewer collection system in 2018 that have been identified as requiring repair, replacement, or rehabilitation.

6.5 Sanitary Sewer Surcharges and Overflows

There were no known sanitary surcharges or sanitary sewer overflows (SSO) within the Darby Creek Basin during 2018.

7.0 CONDITION OF PUMPING STATIONS [§ 94.12.Sec. (a) (7)]

The Township does not own any public sewage pump stations in the Darby Creek Drainage Basin.

8.0 INDUSTRIAL WASTES [§ 94.12.Sec. (a) (8)]

There are a small number of industrial users in the Township (i.e. auto body shops). None of the users discharge an industrial waste to the system. Flows from these users are domestic flows only.

9.0 PREVENTION OF OVERLOAD CONDITIONS [§ 94.12. Sec. (a) (9)]

The Township continues to maintain the sanitary sewer system including identification and removal of illegal connections. No overloads in the basin are anticipated.

*** END ***

APPENDICES

RHM's SUMMARY OF MONTHLY FLOW IN DARBY CREEK

Month	2014		2015		2016		2017		2018	
	Flow Volume (MG)	Total Rainfall (in.)	Flow Volume (MG)	Total Rainfall (in.)	Flow Volume (MG)	Total Rainfall (in.)	Flow Volume (MG)	Total Rainfall (in.)	Flow Volume (MG)	Total Rainfall (in.)
January	33.30	3.58	37.3	2.96	29.2	4.38	29.5	1.63	25.2	3.41
February	30.10	2.42	38.3	4.96	25.7	1.9	31.3	4.51	26.6	6.21
March	36.80	3.14	42.7	3.88	36.0	5.86	32.2	2.05	37.4	5.22
April	33.20	2.91	44	7.85	31.0	3.09	27.5	1.84	34.1	3.84
May	32.50	3.75	54.8	5.59	28.2	1.39	29.2	6.32	35.1	5.53
June	39.30	9.16	34.8	1.71	26.3	8.44	26.6	2.67	33.5	3.7
July	37.50	5.24	26.8	3.85	25.9	2.76	24.9	5.15	28.5	4.07
August	33.00	5.52	27.7	3.45	23.0	1.56	25.1	1.67	29.8	8.96
September	31.90	4.85	24.3	1.5	21.5	3.86	22.1	3.69	34.9	6.55
October	26.60	3.16	25.3	3.04	23.7	4.65	22.2	2.05	36.5	3.47
November	25.50	3.72	26.1	4.77	25.9	3.07	21.5	2.84	45.0	8.66
December	33.80	4.93	27.2	3.53	28.7	5.19	24.1	3.08	49.2	6.59

Total Flow:	**393.5**	**52.4**	**409.3**	**47.1**	**325.1**	**46.2**	**316.2**	**37.5**	**415.8**	**66.2**
Average Monthly Flow:	**32.8**		**34.1**		**27.1**		**26.4**		**34.7**	

EXHIBIT 1

ORDINANCE NO. P 11-2007

AN ORDINANCE OF THE TOWNSHIP OF HAVERFORD, COUNTY OF DELAWARE, COMMONWEALTH OF PENNSYLVANIA, AMENDING AND SUPPLEMENTING ORDINANCE NO. 1960, ADOPTED JUNE 30, 1986, AND KNOWN AS THE "GENERAL LAWS OF THE TOWNSHIP OF HAVERFORD", FURTHER AMENDING AND SUPPLEMENTING CHAPTER 58, *'BUILDING CONSTRUCTION'*.

BE IT ENACTED AND ORDAINED by the Board of Commissioners of the Township of Haverford, County of Delaware, Commonwealth of Pennsylvania, and it is enacted and ordained by the authority of the same:

SECTION 1. Text Amendments

The following amended language is hereby provided in Article I *Building Code*, Section 58-2, *Additions, deletions and modifications,* subsection A. *Existing structures*:

It shall be unlawful for the owner of any single-family, two-family or multifamily dwelling or nonresidential property or premises within Haverford Township, Delaware County, to be used, occupied or conveyed in ownership, in whole or in part, until a certificate of occupancy is approved by the Code Official of the Township, obtained by the grantor or seller and delivered to the purchaser hereof. Such certification shall identify the zoning classification of the subject property and disclose any notice of an uncorrected violation of §58-3 herein, the 1998 International Property Maintenance Code, and any violation of Chapter 149 *[Sewage and Drainage Facilities] or* ~~and zoning provisions of~~ Chapter 182 *[Zoning]* of the 'General Laws of the Township of Haverford', ~~of this Code of Ordinances of Haverford Township~~, and require such owners to insert into any agreement of sale of such property a statement concerning any corrective measures needed. Additionally, the seller of real property in Haverford Township shall replace any sidewalk and walkway segment or sections which contain structural cracks (a crack that is entirely through the concrete) or have a deviation in elevation between blocks in excess of one inch as well as curbs which contain a structural defect or have a reveal of less than three inches from the road surface to the top of the curb.

ARTICLE III. SEVERABILITY

Should any section, sentence, word or provision of this ordinance be declared by a Court of competent jurisdiction to be invalid, such decision shall not affect the validity of this Ordinance as a whole.

ARTICLE IV. REPEALER

Any ordinance or part of ordinance to the extent that it is inconsistent herewith is hereby repealed.

ADOPTED this day of 2007.

TOWNSHIP OF HAVERFORD TOWNSHIP

BY: Stephen D'Emilio
President
Board of Commissioners

Attest: Michael F. English
Township Manager/Secretary

Inspections:

•Conducted Annually

•Door to door inspection will be made

•Inspection for illegal connections consisting of, but not limited to, the discharge of water, spring water, ground water, roof run-off, sub-surface drainage, building foundation drainage, cellar drainage, drainage from roof leader connections, cooling water or unpolluted industrial or commercial processed water into any sanitary sewer, whether by gravity or mechanical means (sump pump)

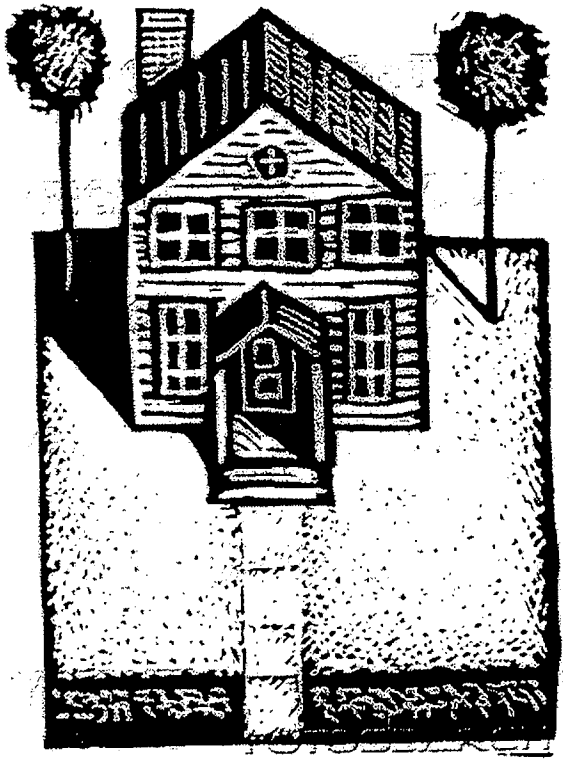
•Inspection will be done with homeowner's permission at a time convenient to both parties

•Inspection by Township personnel, with proper identification, expediently, courteously and with as little interruption to the premises as possible

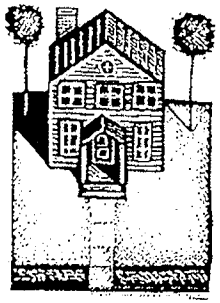
•Call now to make an appointment for this inspection

ILLEGAL DRAINAGE CONNECTIONS COST EVERYONE MONEY!

ILLEGAL CONNECTION INSPECTION PROGRAM



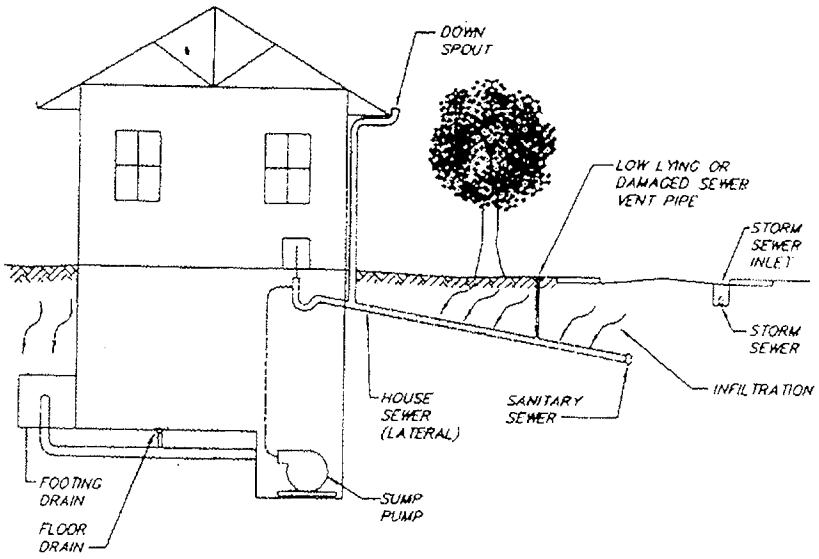
2325 Darby Road
Havertown, PA 19083
610-446-1000
Office Hours: Mon.- Fri. 8:30 – 4:30



In an effort to reduce the overload on our sewer system, Haverford Township has instituted a program aimed at eliminating costly, non-compliant connections.

The Department of Environmental Protection, reacting to lines surcharges caused, in part, by the overload created from illegal connections, has placed a moratorium on all new connections and has required the Township to develop a plan to reduce the burden on the environment. Overloaded sanitary sewers can cause surcharges into private homes and business as well as into the streams and waterways. We want the public to be aware of this problem and the increasing cost to all residents.

A program will be set in motion to provide adequate time for businesses and homeowners alike to correct the problem. Property owners who advise the township of an existing illegal connection to be voluntarily corrected, will be given $50.00 as an incentive toward compliance when the township inspects the connection before and after the correction is made. The township will inspect a property and, where it finds an illegal connection, advise the owner to make the appropriate correction and, in certain instances, cite the offenders who have made no attempt to remove illegal connections.



Sump pumps, foundation, floor and area drains, and downspout connections to the sanitary sewer line are

ILLEGAL AND RESULT IN INCREASED COSTS!

REMEMBER

Should an illegal connection be found, a penalty will be assessed, if after proper notification, the connection is not promptly removed. But, voluntary removals of illegal connections will earn you $50.00

EXHIBIT 2